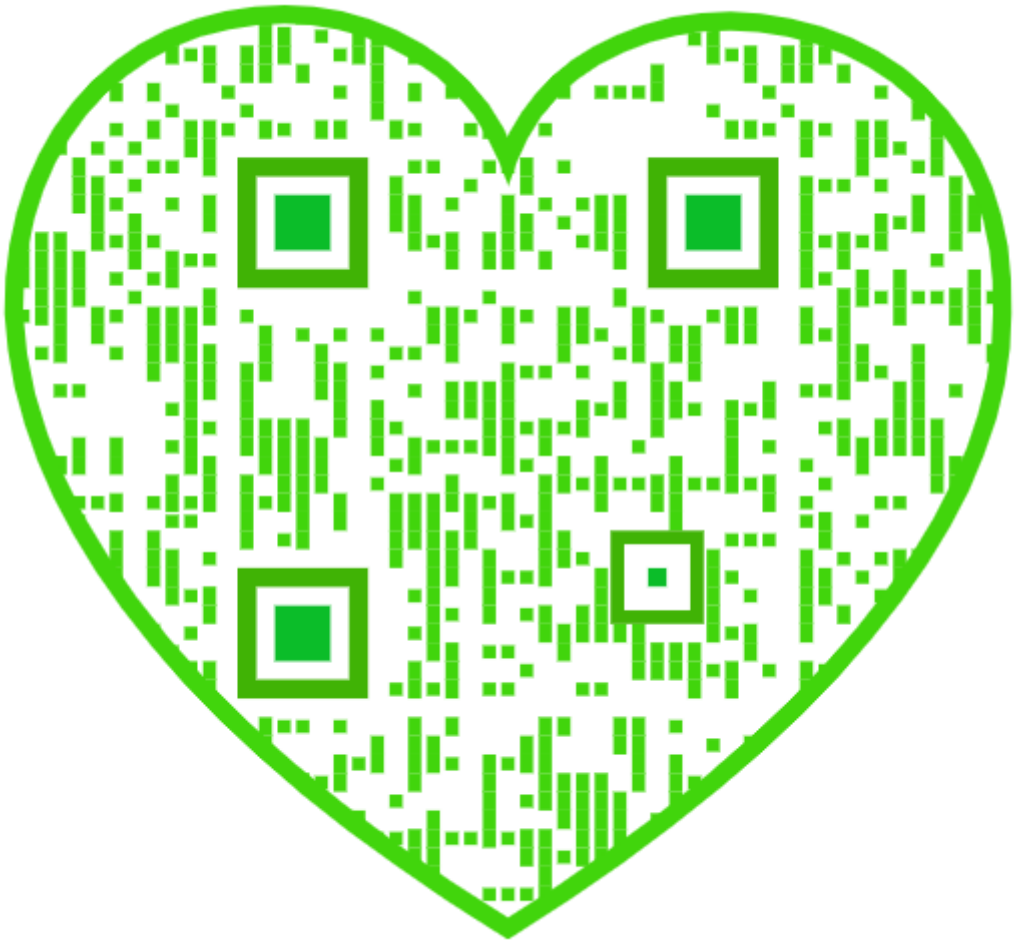
BOOKBINDING

AS A

HANDWORK SUBJECT



Frontispiece

A HOME-BOUND VOLUME.

PITMAN'S HANDWORK SERIES

BOOKBINDING
AS A
HANDWORK SUBJECT

BEING A FULL EXPLANATION OF HOW BOOKS CAN BE BOUND WITH SIMPLE APPARATUS IN A SCHOOL CLASSROOM

BY

J. HALLIDAY

HANDWORK MASTER, COUNTY TECHNICAL SECONDARY SCHOOL, WORKINGTON; LECTURER IN HANDWORK, CUMBERLAND COUNTY COUNCIL; MEMBER OF THE STAFF, BRIGHTON SUMMER SCHOOL, ETC.

WITH A FOREWORD

BY

CANON H. D. RAWNSLEY

HON. SECRETARY OF THE SECONDARY SCHOOLS ASSOCIATION; CHAIRMAN, THE SECONDARY SCHOOL COMMITTEE, CUMBERLAND EDUCATION AUTHORITY; AUTHOR OF "EDWARD THRING, TEACHER AND POET," ETC.

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FOREWORD.

As a firm believer in the educative power of handicraft, it is a true pleasure to find that Mr. Halliday has, in his Handbook of Bookbinding, supplied what, so far as I know, has been a real want.

He has not only written clearly and concisely, but he has admirably illustrated the instruction he gives. He has gone carefully into the prices of tools and materials, and has shown that the work of bookbinding can be graded for the various standards of children which may take up the occupation under their school-teacher's supervision.

It is a great matter that nearly all the apparatus can be made by the pupils themselves, and the interest of the processes is ensured by the appeal which the work makes not to one sense only but to many senses. It appeals to craft of hand. It appeals to the delight of the eye, and not least to the creative sense that is astonished at the result and the usefulness of its labour.

Last, but not least, the art of bookbinding is one that can be learned and practised by girls as well as by boys, and it will be found that, having once learned the rudiments, it is a pleasant fireside occupation for long evenings at home, which will materially add to the neatness and good order of the household, and save much expense at the same time. The child who has gone through this course will make its own Christmas cards, its own note-books, its own volumes of stories, and its own bindings for papers and magazines.

I heartily commend this little volume of practical help to teachers and scholars alike.

H. D. RAWNSLEY.

PREFACE.

In this little volume the author has tried to present the results of his experience in teaching what he feels to be a highly educative occupation. Too long has bookbinding been considered "too expensive," and too often even moderate results have been thought to be beyond the power of children because the necessary apparatus was "too elaborate for the children to use." But, until the analysis has been attempted, have not these objections been made to most of the occupations which are now recognised as part of the school curriculum ?

The aims of the book are to show in the first place how the necessary apparatus may be simplified and made in school, at a cost not exceeding the reasonable allowances of most Education Committees, and, in the second place, so to arrange the operations, that the teacher may secure a fairly regular gradation of difficulty and complexity in sewing, covering with cloth, ornamentation, etc.

The problem of dealing with large classes in handwork is an important one, and a plan is outlined which will, it is hoped, help the teacher in managing this subject even with classes of sixty children. All the instructions, moreover, are put in as practical a form as possible.

This book is a result of the experience of one who has realised that the occupation has certain difficulties as a handwork subject, and who has made an attempt to show how they may be overcome.

The author's best thanks are due, and are here extended to Mr. J. Davies, B.Sc., for valuable aid in reading the MSS. and proofs, to Mr. J. T. Shaw, A.S.A.M., for many of the illustrations, and to Canon Rawnsley for the Foreword.

J. H.

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CHAPTER I.

INTRODUCTION.

THE possibilities of Bookbinding as a part of the "Handwork Method" do not appear to have been very generally investigated. By those who use Handwork as a means of supplying an environment in which a child may find stimuli to creative effort, of providing situations to which a child shall adapt himself, this occupation will be found to possess decided value. One is almost inclined to the opinion that it is of greater value than many schemes of Woodwork, because in Bookbinding the end is a thing desired—not a teacher-imposed task.

One reason why Bookbinding has not been taken up more in schools is to be found in the fact that there is a peculiar mystery in a well-bound book hanging round the number, nature and order of the operations which have been the means of producing such a compact and strong whole out of so many "bits," and "at such small expense, too."

The operations involved in the construction of a well-finished book are very numerous. The work can be graded in difficulty to meet the varying capacities of children in the middle and upper standards of the elementary school, and in all the forms that take Handwork as a subject in secondary schools. Accuracy is a *sine quâ non*—and accuracy of a much broader type than is obtainable from most other single subjects. The aesthetic value, as all will admit, is very strong and real. Bookbinding is an inexpensive occupation, yet even in its most economical working the results obtainable may be very good.

At all stages Bookbinding may be made a means of social service. The children of the middle standards might make their own note-books, and scrap-books for the infants; upper standards could repair and bind music. A friend of the writer's does not buy any exercise or drawing-books for his school; the children make their own. Magazines presented to the school are bound, and form the nucleus of a school library. The facility with which the work

connects itself to the lessons in art is so natural that a true correlation is established. The need is felt, for instance, for some decoration outside or inside the backs ; the design and cutting of a stencil plate and the application of colour follow. There is purpose right through, and the child-pleasure in realisation has a very stimulating effect on the whole work.

It is equally suitable for girls and boys. It can continue, or replace altogether, the work in cardboard ordinarily carried on, containing as it does many of the operations involved in that work. A child need not pass through a course of cardboard work to be able to bind books. Very simple work leading up to the substantial binding of books can be done in the first standard or in the top class of infants. Greeting and menu cards, or small folios of the Christmas card type, may easily be put together. The paper used in drawing with pastels is most suitable for this class of work. To make a small book of this kind, let the children decide on the kind of thing they want, the teacher guiding them by a little talk on the size, the number of leaves, the proportion, etc., most suitable for the particular article required. These details settled, paper of the proper colour is given out, and, after a few hints from the teacher, the children set out and cut with scissors, or tear very carefully to size.

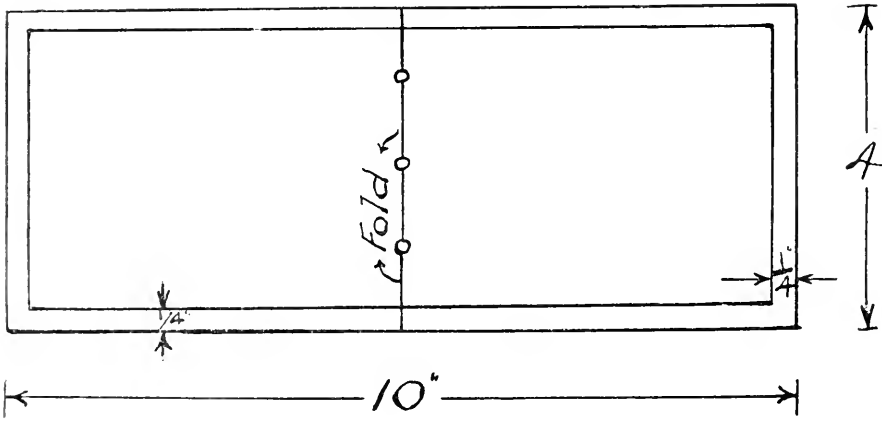

FIG. 1.

Small Greeting Card.

Let us make a small greeting card : size, when folded, 5 in. by 4 in. ; number of pages, including cover, six ; tied up with ribbon

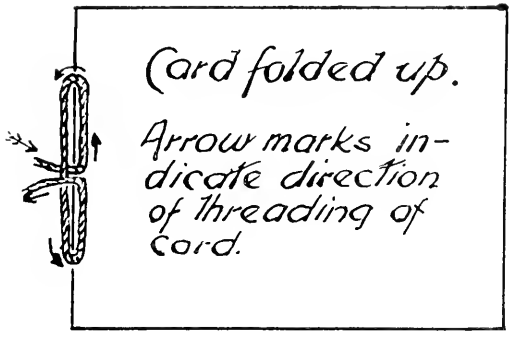
Card folded up.
Arrow marks indicate direction of threading of cord.

FIG. 2.

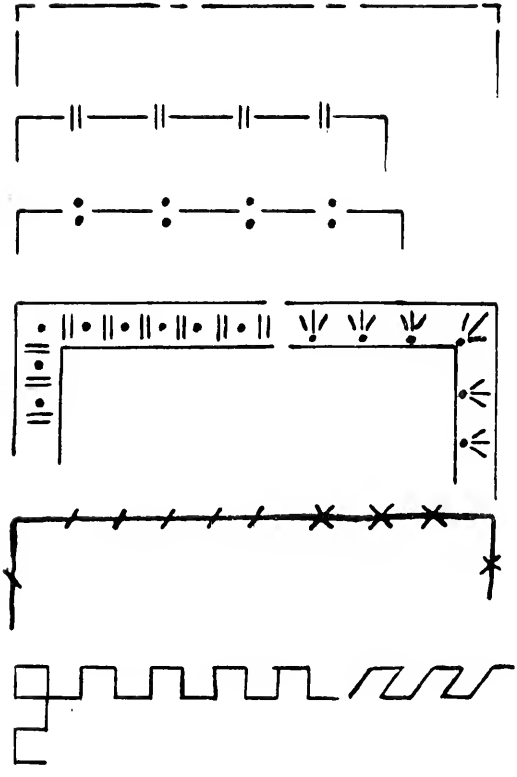

FIG. 3.

or silk cord. For the cover take any stiff paper of a shade to match the pastel paper to be used for the inside. Set out 10 in. by 4 in., cut to size, and fold down the middle of the length. For the inside, take pastel paper and cut two pieces 9½ in. by 3½ in.; this leaves a margin on the cover. Fold these also down the middle of the length. Unfold all, lay the leaves on the cover, mark out the positions of three holes, and pierce with a brad-awl or other similar tool, belt punchers being best (Fig. 1).

Take a piece of narrow ribbon or silk cord and thread it through, as shown in Fig. 2. Tie it in a bunch on the back, and the card is ready for decoration. This may be done in crayon, or in crayon and free cutting in paper combined. If done in crayon, simple and effective borders can be arranged on the basis of needlework stitches, *e.g.*, line and dot, tacking-stitch, and knot. When once a start has been made in the arrangement of such simple work as this, many patterns will be forthcoming; and a commencement in real design will thus be established. (See Figs. 3, 4.)

Materials.

It has been said that the occupation is an inexpensive one. A book can be bound in a workmanlike manner with the aid of the following—(1) cardboard, (2) paper and cloth, coloured or white, (3) tape or string, (4) sewing thread and needles, (5) glue-pot and glue, (6) knife, (7) ruler, and (8) paste.

(1) Though millboard is the best material for boards, the writer finds that he can get along quite well with the cardboard brought by the children. This comes in the form of hat-boxes, blouse-boxes, etc.

If a single card is not thick enough, a board built up of two or more thicknesses is even better than a single board of the same total thickness. Old exercise-book backs may be built up into serviceable boards. In the writer's school, the writing-pad and loose-sheet filing system is in vogue for all written work, and the sheets of cardboard forming the bases of the pads, about 8 in. by 6 in. in size, are requisitioned from the master in charge of stock, and are very useful for small work.

(2) Brown paper of various shades and textures—such as the children can bring, or such as may be procured from the school office—answers very well for covering boards and for coloured end-papers (the papers forming the inner linings of the covers and the next pages). Other self-coloured or marbled papers can be purchased at a cheap rate from the educational supply firms. Any clean cloth, or scraps of coloured linen, calico, or plain canvas, all found in Mother's or the sewing-mistress's clippings-bag, are good for "half-binding" in cloth. Some really fine results can be obtained in these materials if the colour scheme is carefully

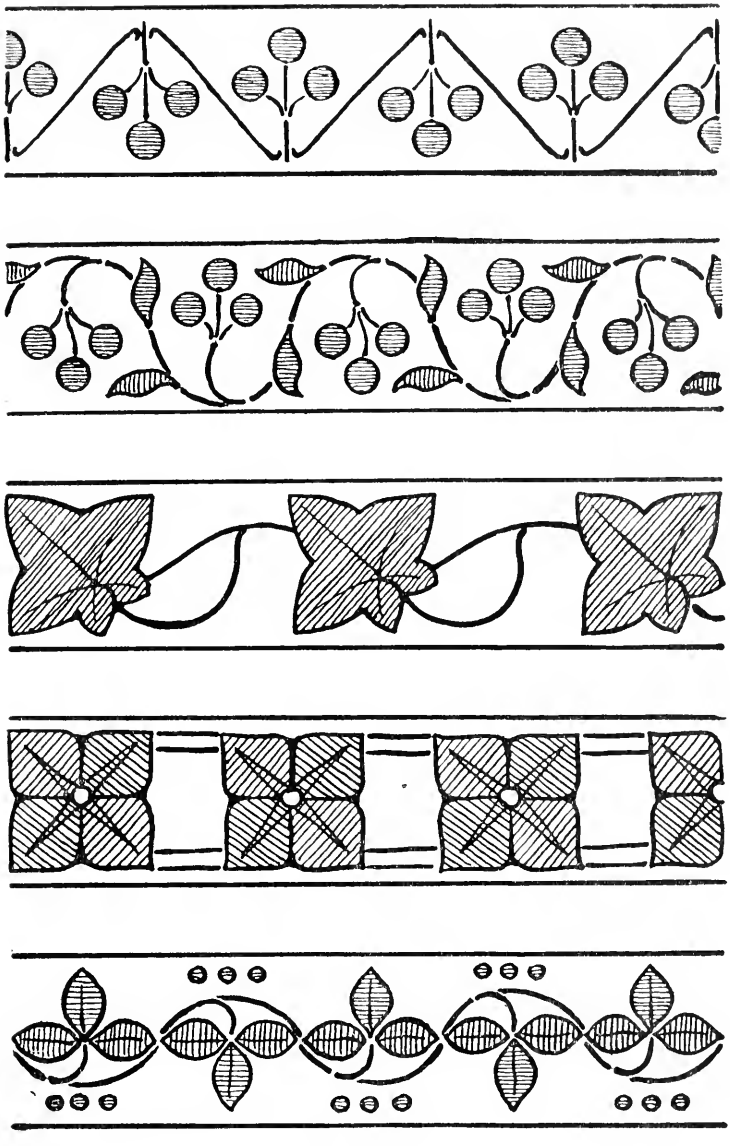

FIG. 4.

considered, and some decoration in colour applied. Binding and covering cloths, as supplied by bookbinders' merchants and the educational supply firms, are, of course, very good if it is thought advisable to go to the expense. Leather is not very expensive; skins averaging 38 in. by 34 in. range in price from 2s. 6d. each upwards.

(3) Ordinary unbleached tape at a penny a knot, or the string taken from parcels that come in, cannot be deemed expensive.

(4) Ordinary small darning needles at a penny per packet are the most convenient, and white-glazed or unbleached linen thread is the most satisfactory for stitching. Sewing cotton is not strong enough.

(5) This is the most expensive item of all, unless there is a woodwork room with *two* glue-pots as part of its equipment. Do not "borrow the glue-pot" if the unfortunate woodwork master has only one in the place. Even the glue-pot can very easily be dispensed with by using a saucepan for the water and a jam-jar for the glue. Any good glue is right.

(6) The children's pocket-knives, or the knives made specially for cardboard work (*e.g.*, London Pattern, as supplied by the Manual Training Tool Co.), can be used for all cutting of cardboard and paper.

(7) Metal rulers as used in cardboard work are most suitable for use with the knife; but, as few children will be preparing boards at the same time, half-a-dozen will satisfy a large class.

(8) Paste, as supplied in bottles by the various makers, is very expensive, and often is too wet. Bookbinders make their own, and that is the writer's practice, both for bookbinding and for cardboard work. It is much cheaper to do so, and one can distribute portions of paste on, say, pieces of cardboard, and have no hesitation at the end of the lesson in consigning the "leavings" to the waste-paper basket.

The following are recipes for pastes which will be found thoroughly reliable and of good strength.

(*a*)	White flour	4 oz.
	Alum	½ oz.
	Powdered gum acacia	1 dram.
	Hydranaphthol	½ dram.
	Water	1 pt.

Mix with half of the water, boil the remaining half and pour it into the mixture, and then bring to the boil, stirring all the time.

(*b*)	White flour	1 lb.
	Alum	2 oz.
	Oil of cloves	a few drops.

Mix with water to a thin paste, avoiding all lumps ; add 4 pints of cold water ; heat gently in a pan, stirring occasionally until it boils, when it should be continually stirred for five minutes. This is more easily prepared in smaller quantities in the same proportions as above.

A good white paste for " Mending " is the following, taken from Mr. D. Cockerell's book on *Bookbinding and the Care of Books.*

Ordinary flour	1 teaspoonful.
Corn-flour	2 teaspoonfuls.
Alum	½ teaspoonful.
Water	3 oz.

Mix carefully, breaking up all lumps, and heat in a clean saucepan, stirring all the time with a wooden spoon. Boil for about five minutes, taking care not to burn. Rice flour or starch may be substituted for corn-flour. Ordinary paste is not white enough for repair work, and is apt to leave unsightly stains. A corn-flour paste keeps well for about a week ; as soon as it becomes hard or watery, a new supply must be made. All the above pastes are used by the writer, and can be recommended. Some people recommend poisonous disinfectants for pastes, but we cannot afford to take any risks in school, and oil of cloves will be found quite an efficient antiseptic, at any rate for the length of time that a prepared supply of paste will last.

Since writing the above, the author has had brought to his notice, and used with excellent results, a paste powder known as " Lap." It is a very good adhesive, is easily prepared, makes up free from lumps, and is cheaper than flour paste. A small quantity of disinfectant should be added.

CHAPTER II.

AN EXERCISE BOOK OR SMALL NOTE-BOOK.

SIMPLE binding can be done by the middle standards with the aid of materials described in the previous chapter. In the first place, let us take the operations involved in the making of an exercise book or small note-book. The great advantage, by the way, of children making their own books lies in the fact that they are not afraid of spoiling them with attempts at self-expression. When a fine new, sometimes perfectly made, exercise book is presented by a teacher to a child in a manner suggesting to the latter that he ought to be grateful to a generous world for making such provision for him, self-expression is somewhat checked. Let the child make his own book, and see which he *values* more. The paper may be already cut to size, double sheet, or the children may be given sheets a little larger than the required size, and allowed to set out and cut their own. There are pros and cons in each case, and the teacher must decide for himself which to adopt. Plain or ruled (ruled by the child) white and coloured papers are supplied according to the use to which the book is to be put.

To start, say, a note-book, take an imperial sheet of drawing paper and fold it into sixteen parts. During this operation the sheet will pass through the various sizes which are denoted by the terms " folio " (folded once to form two leaves), " quarto " (folded twice to form four leaves), " octavo " (folded three times to form eight leaves), and " sexto decimo " or " 16mo " (folded four times to make sixteen leaves). The term " Imp. 16mo " means that an imperial sheet has been folded to form sixteen leaves. This method of describing the size of a book is now losing some of its significance, as it is becoming customary to associate the terms with a definite size of page, irrespective of the size of the sheet from which the pages forming a section were made.

Having folded the sheet, decide on the way in which the book is to open, *i.e.*, in the reporter's note-book style, from a short side, or from a long side. The leaves can be securely stitched together with thread as shown in Fig. 6, but give out the needles and thread and, without any demonstration, let the children try to stitch the papers together. Many children (and adults) seem to think that the security of the stitching depends on a large number of stitches. Results, too, are largely affected by the cleanliness or uncleanliness of the hands. Reference can always be made to other books, but it may be necessary to show a few children. They will probably be in the minority. On examination of the results, it will be found

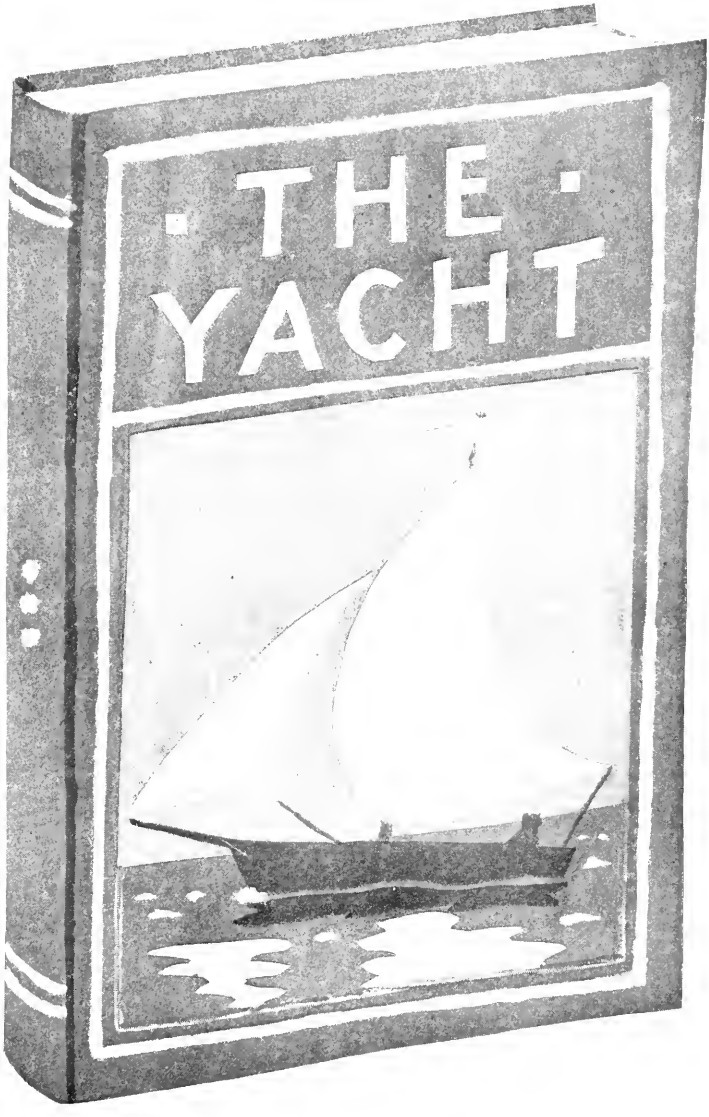

FIG. 5.

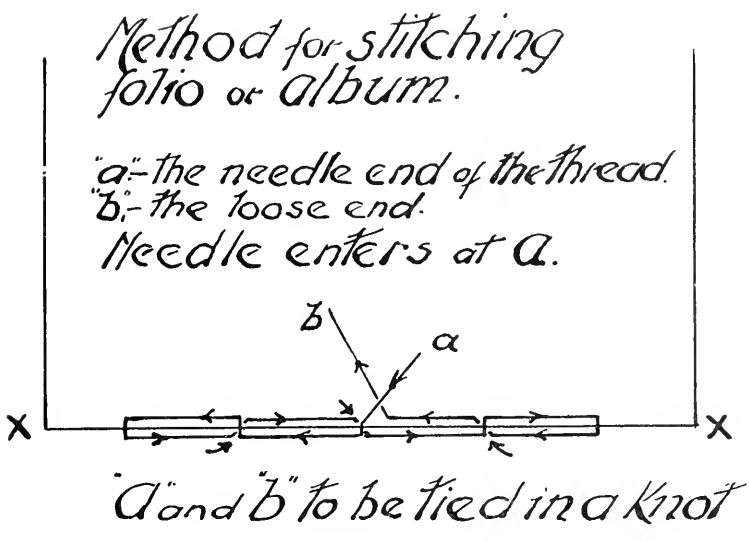

FIG. 6.

that there are many children quite capable of showing the few less capable ones how to stitch. The child now becomes a teacher, the teacher acts as a director. The writer has found this method very successful in dealing with large classes. The example described opens from a long side.

The backs are next prepared. These may be of thin cardboard, cut to the size of the paper, or $\frac{1}{8}$ in. larger all round, and covered on one side with the paper chosen for the finishing cover. Pastel paper or smooth, coloured cartridge paper is excellent for covering these backs. It affords good surfaces for suitable decoration in colour. Manilla paper is also very good for hard wear, and renders cardboard covers unnecessary.

In fixing the covering paper to the cardboard, it will be necessary to water down the paste to a thick creamy consistency, and to rub it well into the cardboard. Lay on the paper, rub it down to remove all air pockets, place a zinc plate or a flat board over it, and leave it to set. When dry, double it up into two equal parts, open it out again, and paste the inside. Open the book already stitched up, lay it out centrally on the pasted side of the cover, and lift up to the centre all but the two end leaves, as in Fig. 7 ; rub these well down on to the cardboard, place a flat piece of wood on each side, and leave it to set ; or, double it up at once, watching carefully

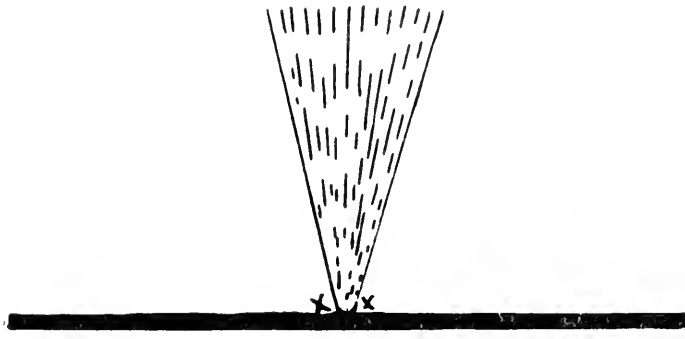

FIG. 7.

and correcting any tendency to crease at XX, and place it under pressure to ensure flatness.

When the book is dry and well set, the edges must be cut. To do this, draw a line parallel to the back edge and at such a distance from it that, when the book is cut along the line, it may be certain that the narrowest leaf has about $\frac{1}{8}$ in. cut off it. Put the safety ruler along this line, take the knife, and, using the point—which must be very sharp—cut carefully but firmly, with the blade always in a vertical plane, and in the same groove every time it is drawn along. Cut one or two leaves at a time until through all. Take a try square, set the stock along the front edge and draw a line along the top edge, setting back a distance sufficient for the line to fall inside the edge of the shortest leaf. Cut off and repeat at the bottom edge. With a chisel round off the corners to a quadrant in plan, and the book is finished.

A drawing-book can be made in the same way, and, if the leaves are of different-coloured papers, an aid in the training of colour-perception is secured, especially as the different-coloured sheets are always ready for reference. Simple designs may be arranged for the titles of the books, and for the decoration of the covers.

Figs. 5 and 10 illustrate examples executed in crayon and free cutting in paper.

Albums for photographs, picture post cards, examples of free cutting, arithmetical work in paper, etc., can be made similarly to the above note-book, but, in order to prevent the bulking out of the leaves when it is full, additional thickness must be put into the back. This is done by cutting strips, 2 in. wide, of the same kind of paper as that used in the book, folding them down the middle and stitching them in as shown in Fig. 8. It is advisable not to

attempt to put too many leaves into this book. It is made up in one section, and too great a thickness, say about sixteen pages, will produce a bulkiness pleasing neither to the eye nor to the hand.

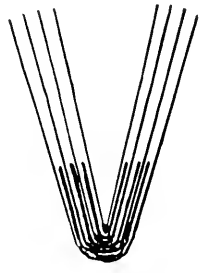

FIG. 8.

It is sometimes desirable that these books should be kept securely closed when not in use, and in order that this may be done, the following device may be used. When the book is complete, take a piece of ribbon of suitable colour, about a yard long and 1 in. or $1\frac{1}{4}$ in. broad. Cut slits equal in width to this ribbon at A and A on each side of the cover (Fig. 9). Thread the ribbon as shown, gumming the paper where the ribbon is in contact with the back edge, and inside the covers as well if thought necessary. One ribbon may be used instead of two, placing it in the middle of the cover.

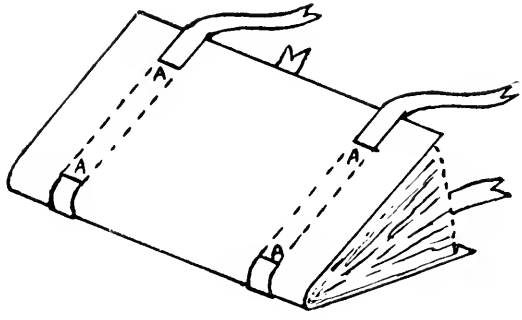

FIG. 9.

The experience gained in working through the construction of such simple articles as the above will be of great assistance to the

child when more complex work is undertaken. It will have set him looking into books to see how they are put together, and so started the inquiring mind along the path of acquisition.

These books will be found quite as serviceable as ready-made books, and perhaps they are not so liable to lose their covers. Any single-section book may be bound in this way.

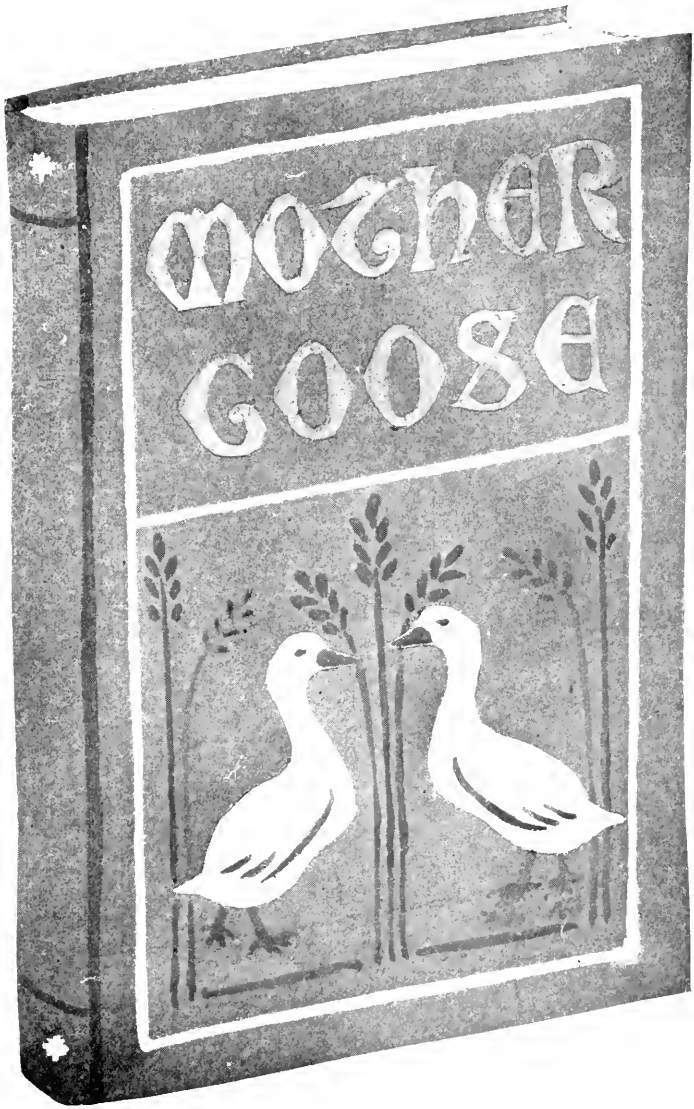

FIG. 10.

CHAPTER III.

SMALL SECTION BOOKS.

CHILDREN in the upper standards will be able to bind single-section books in a much stronger way. Instead of stitching the leaves together as in the exercise book, the following method could be adopted.

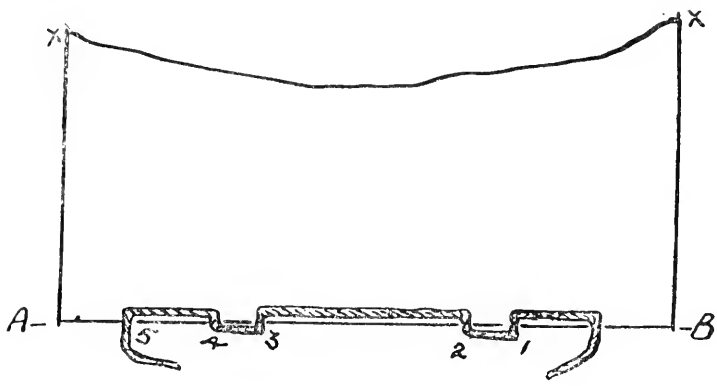

FIG. 11.

Let AB represent the back edge of the "section," as each division in a book is called, going out beyond XX, ABXX being a plan. At about $\frac{3}{4}$in. from B, the threaded needle is passed in through the middle of the section, out at 1, in at 2, out at 3, in at 4, and finally out at 5, leaving spaces between 1 and 2, 3 and 4, equal to the width of tape it is proposed to use, say, $\frac{1}{2}$ in. Now tie the ends of the thread together. (See Fig. 11).

If this book is composed of leaves of printed matter, it may be necessary, before stitching, to cut two double leaves of plain paper, white or coloured according to taste, and fold them over the outside of the book, thus apparently adding four more pages, two at the front and two at the back. The two outer ones will form end-papers to be pasted on to the inside of the boards when finishing, and the other two leaves will act as protections for the title-page and the back page of the book. These are surfaces for decoration. If the book is a "made" one, *e.g.*, an album, leaves of the book will themselves be utilised for the same purpose. A "waste" double leaf is added to keep the coloured leaves clean during the succeeding operations, and the tapes will be fastened down upon it.

The tapes, about $2\frac{1}{2}$ in. long, are now passed through the loops 1 2 and 3 4, and a piece of book muslin, thin linen, or calico, about $2\frac{1}{2}$ in. wide and about $\frac{1}{2}$ in. shorter than the length of the book, is pasted over the back. This covers the tapes and must be rubbed well down on to the "waste" papers on each side up to the edge of the muslin. The tapes are now enclosed between the "waste" and the muslin. (See Fig. 12.) Cut off the superfluous waste.

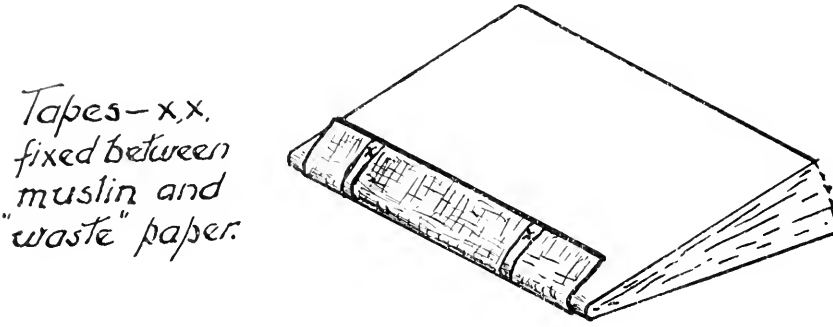

FIG. 12.

The following method of fixing the muslin might be adopted with equally good results. Fold the leaves as for the exercise book, adding the end-papers and a "waste" paper over all, having previously pasted the muslin strip on to the middle of the back of the latter. Stitch all together as for the first exercise book, and then cut off the superfluous paper.

Now prepare the boards. Take four pieces of thin straw-board, leather-board or mill-board, and cut them to size about $\frac{1}{8}$ in. larger than the book. From the side of the board which is to be placed against that part from which the book opens (called the "back"), mark off a margin of about $1\frac{1}{4}$ in. (See Fig. 13). Glue or paste

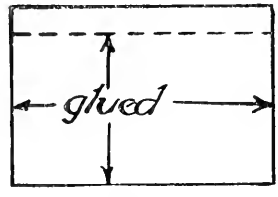

FIG. 13.

the larger portion as shown, and stick two boards together. The same procedure must be adopted with the other pair. Two pieces of straw-board and two pieces of strong paper will serve just as well as four pieces of board. Put the boards under any flat heavy body that can be dragged into service. For this purpose an old letter-copying press is an excellent thing, and can often be purchased for a few shillings ; or a pair of good strong bolts, say $\frac{3}{4}$ in., purchased for a few coppers, can be fixed in two stiff pieces of wood to make a very efficient press. (See Fig. 14.)

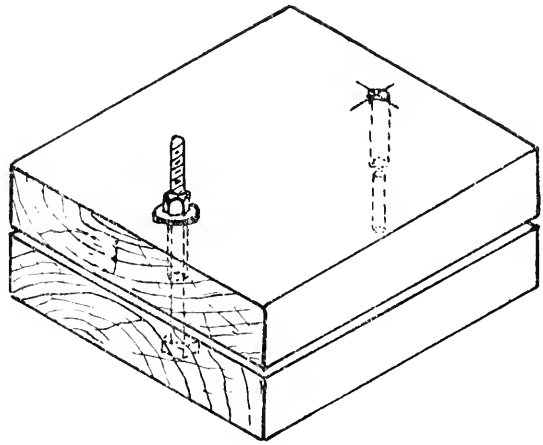

Fig. 14.

When the boards are well set—they should be left for at least twenty-four hours—open them at the unglued edge, insert the muslin and tapes, push well up to the back and mark off equal margins on the " front," " head," and " tail " (the technical names for the open side, top, and bottom of the book). For width of margin a projection equal to the thickness of the boards is a safe rule to follow. Take off the boards and trim the edges, making them clean and square. Now paste the inside of the split boards and the muslin and insert again, watching carefully the margins. Do not push the boards right up to the back, but leave about $\frac{1}{8}$ in. space for a hinge. (See Fig. 15.) Put the book into the press and leave it to set.

Prepare the cloth, linen, leatherette, paper, or leather—whichever is to be used—for covering the back and corners for a " half-bound " book, or the whole surface of the boards for a " whole " or " full-bound " book. Suppose the " half-bound " book is taken. Measure

the length of the book and add about 1 in.; this can be taken as the length of the cloth for the back. The width will vary according to the size of the book, and it must be proportionate to the width of the back. Consider, say, an 8 in. by 6 in. cover. Then the cloth might be extended from the "back" on to one of the boards for about $1\frac{1}{4}$ in., passed round the "back" and on to the opposite

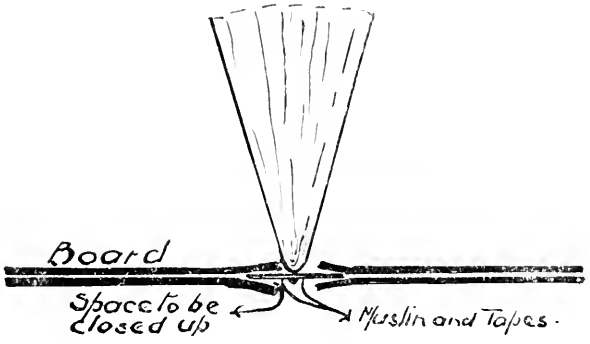

FIG. 15.

board a like distance. The size of the corner pieces will vary in the same way. To set out the corner pieces, settle the distance from the corner that the cloth will extend when fixed, add $\frac{3}{4}$ in. on to this for overlap inside, and cut out a square of cloth to the size thus obtained. For an 8 in. by 6 in. book, the square might be 3 in. Cut into two parts across the diagonal and take off the corner in a line parallel to the diagonal. (See Fig. 16.)

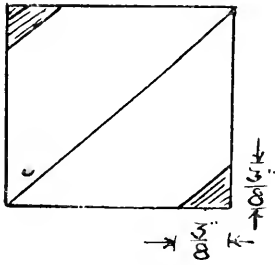

FIG. 16.

The corners and back-cover are now ready for pasting on. Take the book out of the press, file off the back edge of the cardboard to do away with the abrupt line of junction, slit the muslin at both sides of the "head" and "tail" for a distance of about $\frac{1}{2}$ in. to

allow the cloth to be turned in on itself. Both children and adults are sorely tempted here to cut the cloth in order to turn it over the head of the book. By cutting at the head all chances of a good finish are absolutely lost. Instead of cutting the cloth, the muslin is cut as shown in Fig. 17. Paste the cloth back piece and corner pieces; fix the latter, first rubbing them well down on the face,

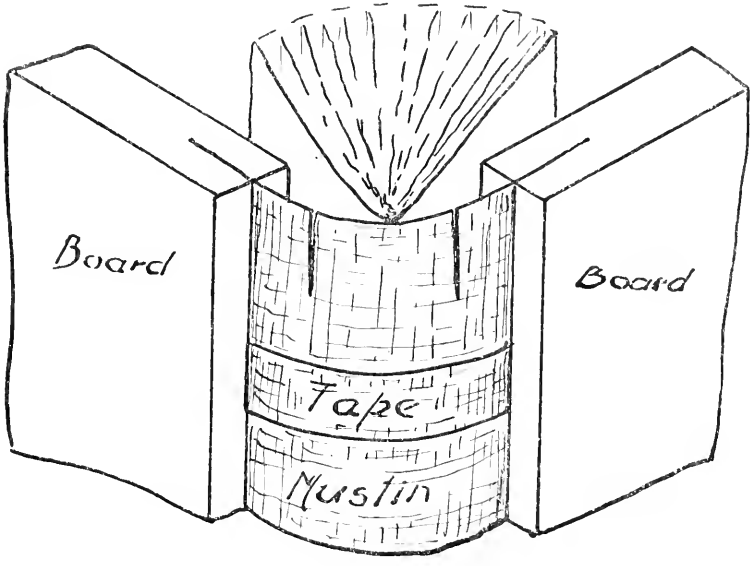

FIG. 17.

leaving such a margin as will ensure a good close mitre[1] on the inside when the cloth is turned over the edge and on to the inner face of the board. The four corners done, the back cloth may be put on and rubbed well down on to the back. Now stand the book on its end, draw the cloth away from the top of the board, double the projecting part back on itself, at the same time putting it through the slits in the muslin, over the edges of the boards, and on to the inside. Repeat at the other end, and then leave to set.

The space between the corners and the back cover can now be covered with paper to match the colour of the cloth, laid well down on to the boards, the edges being turned over, and having a margin inside of about $\frac{1}{2}$ in. The shape of the "filling in" pieces of paper can most easily be found by placing the sheet from which the piece

[1] A mitre is a joint in which the edges of the cloth meet at an angle of 45°.

is to be cut inside the book, immediately underneath the board. (See Fig. 18.) The joint between the leather or cloth and the cloth or paper covering must be that known as "butt" (*i.e.*, the edges of cloth and paper exactly meet to form a line). An overlap of paper does not improve the appearance of the finished cover.

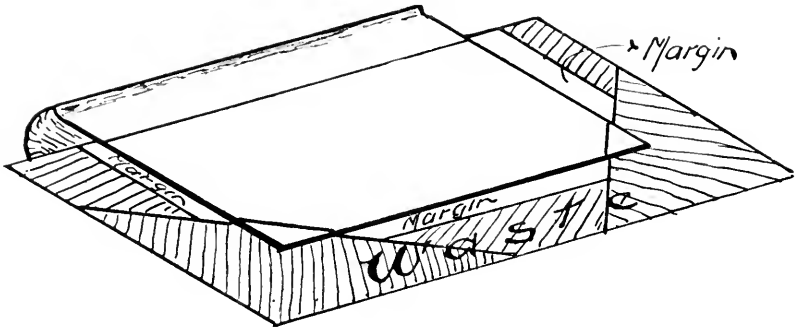

FIG. 18.

In small books (*e.g.*, Imp. 16mo), there is not much room for corners, and it is a question whether they give so pleasing a result as the method, now adopted by many bookbinders, of covering with paper the whole of the board not covered by the cloth at the back. There is no doubt that the plain rectangular surfaces lend themselves more easily to suitable decoration.

Now paste back the end-papers, handling the book very carefully the while, insert zinc plates, front and back, put it into the press, and leave it to set. When it is set, leave it for two or three days, if possible, but for at least twenty-four hours, and then open it carefully by placing it closed on a table, opening a few pages from the front and then a few from the back, and so on until the middle is reached. Do not open a book straightway at or near the middle.

Now, all these operations sound as if there would be a necessity for a tremendous amount of demonstration by the teacher. As in all other occupations, so in bookbinding, there are quick workers and "others." Therefore, very soon a stage is reached when a large number of different operations are going on at the same time. The writer has found it necessary to demonstrate only to the leaders as a small group, or to *the* leader alone. When the need for some assistance is felt by the next child, the leader then becomes a teacher. He demonstrates to his neighbour, who in turn, when requested by some other, at the suggestion of the teacher, lends his aid. Here we have a fine opportunity for the development of a realisation

of one's duty to one's neighbour, for the creation of an environment in which every individual in a group meets with others whose development he assists, or upon whose strength he is dependent.

Where work is being done for the school there is a still stronger development of this principle, because a well or ill-finished article is a matter of consequence to the whole class—to *us* instead of to *me*—and woe betide any one who does not tackle his share of the work fairly and squarely, and do it to the best of his powers.

A large number of operations are moving at the same time, and it is an advantage to the weaker workers to know exactly what is to be the next operation, and what the final result. Considerable freedom of movement should be allowed, in order that slow children may see what is being done by the quicker ones, and ask their advice. This helps to clear the vision and develop the foresight of the former, and to strengthen and make sure the power and knowledge of the latter.

The above method is most helpful to teachers who are taking this subject with large classes. The class can be split up into groups with one or two of the most advanced children as leaders of each group. These leaders are given the privilege of helping and supervising the work of the members of their group. In this way the work of teaching a class of forty children may be considerably lightened.

CHAPTER IV.

BINDING THICKER BOOKS.

We now come to the more complex binding of thicker books. This can be very well done by the children of the fifth, sixth and seventh standards of the elementary school, and the junior forms of the secondary school.

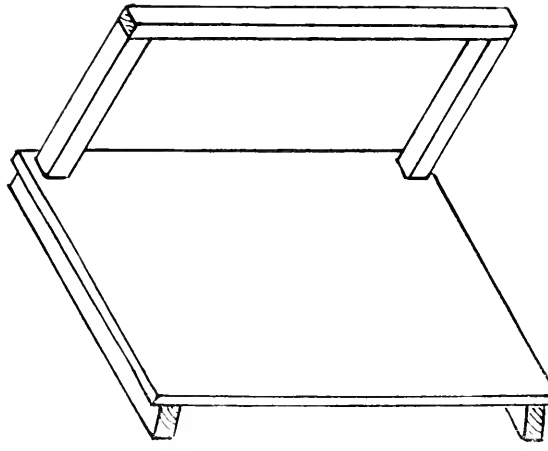

Fig. 19.

The books are obtained from all quarters—magazines from home, old books apparently beyond repair, school books in need of repair and reconstruction, magazines bought or given for school use,

FIG. 20 (*a*)

FIG. 20 (*b*).

portfolios for nature study and camera work, etc. Plenty of work can be found, and, what is more, it is work which is waiting to be done—no teacher-suggested or imposed model this!

A word of caution is necessary here. Some children may bring very old books, the sections of which are folio sheets, *i.e.*, two leaves to a section. The book may be cord-sewn and very solidly put together. When the backs are cut off and breaking-down is commenced, it is too late to find that the work of breaking-down, repairing, and re-binding is utterly beyond the powers of a child. It is advisable for the teacher to examine most carefully a very old book, and endeavour to find out exactly how well, or how badly, it is made. Children do not possess unlimited patience, and it is better that the child should be disappointed at once, for a short time, than allowed to start on a piece of work which will ultimately make him dread the approach of the lesson. Some of these old books illustrate well the patience of the bookbinder.

Our first need is a stitching-frame. Any simple affair consisting of three sticks and a table will do. If there is a woodwork room connected with the school, well and good; the boys will each put together a couple of stitching-frames in one lesson. Three pieces of one-inch square white wood, two about 9 in. long and the third about 6 in. longer than the book to be bound, and a piece of three-ply wood—say from a tea-chest—of about the length of the third piece of wood, are all that is necessary, arranged as in Fig. 19. Feet may be added.

A chair seat and the cross-rail in the back, and a stool with a cross-rail between the legs, placed upside down, make quite efficient stitching-frames; or again, two upright pieces attached to the edge of a deal table-top, and crossbar fixed as in Fig. 19, will answer the purpose just as well as the most expensive frame with upright screws, movable crossbar, and wood nuts. See photographs in Figs. 20 (*a*) and 20 (*b*).

The stitching-frame having been obtained, the book to be bound must be considered. Is it in "parts"—as a weekly or monthly magazine? Is it an old book to be rebound, or a totally new book such as an album? Let us suppose it to be one of the first class, *e.g.*, the *Children's Encyclopaedia*. The first operation is the breaking-down of the parts. These are wire-stitched, *i.e.*, fastened together with wire staples, and there is an outer cover fastened on to the back edge of the part by means of glue. Take out the staples very carefully, so as to avoid tearing any leaves, wet the backs to soften the glue, and take the part to pieces, called "sections." Break down the number of parts required to make up one volume. If in any other book the sections are stitched together, carefully cut the stitching in the middle of each section. Do not attempt to bind parts without breaking them down into sections.

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There may be a saving of time, but the result will be far from satisfactory.

At the bottom left-hand corner of each section will be found a letter or number. Thus, the first page of the first section in the first part might be indexed A or 1; the first page of the second section would be lettered or numbered B or 2; and so on through all the sections forming the volume. If there are more sections than letters in the alphabet (by the way, the letter J is generally omitted), then a start is again made at the beginning of the alphabet with the addition of the figure 1. These figures and letters enable us to arrange the sections in their proper order. The process is termed "collating"—gathering and placing in order.

All glue must be cleaned off the back of each section with a bone folder or a knife. In doing this it is quite likely that some paper will be torn away, and necessitate the repair of the sections so damaged. This brings in another operation, that of "guarding."

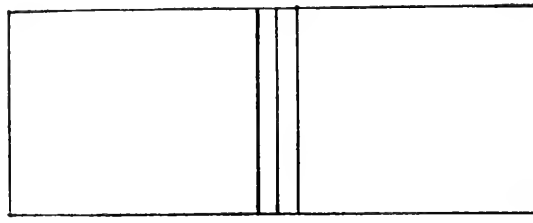

Fig. 21.

This consists in pasting strips of very thin strong paper, about $\frac{3}{4}$ in. wide, on to the back of the section, or the pair of leaves to be repaired, the paper extending $\frac{3}{8}$ in. on each side of the fold. These guards should be made a little longer than the sections, and cut off flush when well set. The corn-flour paste described on page 17 is the best to use for this purpose, as ordinary paste is apt to leave dirty stains.

Repair all sections that are damaged, keeping the collation correct all the time.

We are now ready for the end-papers, which should always be stitched, not stuck, into the book. Obtain a sheet of paper to match the paper of the book, and about 1 in. longer than a double page. Fold this down the middle; then draw a line parallel to the centre line about $\frac{3}{8}$ in. from it, and on the opposite side a similar line (Fig. 21). Run down these lines with a bone folder and fold up as in Fig. 22. Now take a double sheet of coloured, plain, or marbled paper, according to taste but matching the colour of the cloth, leather, etc., to be used. Fold this sheet down the middle,

and paste it on to the first sheet as shown in Fig. 23. Two end-papers arranged in this way will be required, one for the front and one for the back. An additional double page may be put in on the other side of the flange ; this will be stitched, not stuck in.

Prepare now for stitching. For beginners the simplest method is stitching on tapes. Take the frame, arrange the sections on the

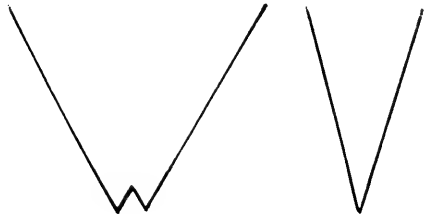

FIG. 22.

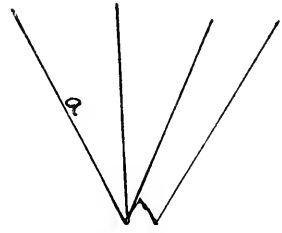

FIG. 23.

board, perfectly upright at the "head" and flat at the "back." In order to get this regularity, take hold of the book, and holding loosely, let it drop back downwards on to the table. This will ensure the backs of all the sections being brought into one plane. Do the same with the "head" of the book. Set up the sections on the table of the sewing frame as in Fig. 24. Arrange a tape

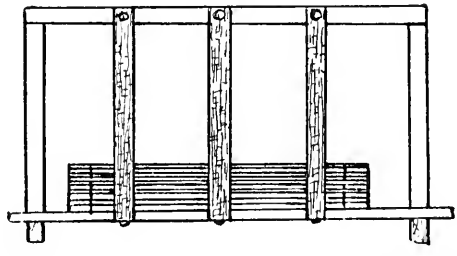

FIG. 24.

in the middle and one on each side of it about $1\frac{1}{2}$ in. from the head and $2\frac{1}{2}$ in. from the tail—the exact distance depends on the amount to be cut off the head and tail. Fix the tapes at the top to the cross bar, and at the other end underneath the board, by means of drawing-pins. Now mark with pencil on the backs of the sections the exact positions of the tapes and midway between the top tape and the head, and between the bottom tape and the tail, drawing lines to represent the positions of the kettle stitches. This is the name given to the stitch used to connect each pair of adjacent sections. Every section must be marked, as upon the correct working to line depends the success of the stitching, and of the ultimate result. Take the sections off the table. We are now ready for the stitching. Take a yard or so of good linen thread, and thread the needle. Lay down the first end-paper (Fig. 23), *a* being in contact with the board and against the tapes, according to the lines already made. Stitch through this as shown in Fig. 11, which is a plan of the back edge of the end-paper and the tapes.

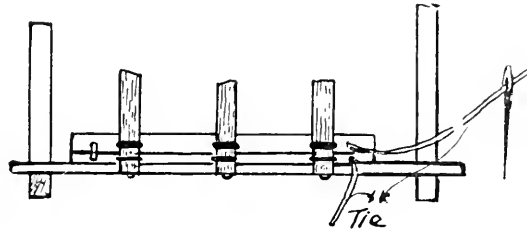

FIG. 25.

The line of stitches must be placed between the pair of leaves nearest the body of the book both at beginning and end.

Now lay on the first section, the front or title-page adjacent to the top sheet of the end-paper. Repeat the process of stitching from left to right, the needle finally coming out exactly above the point of its first entry, in the line of the kettle-stitch. This thread, and that projecting from the end-paper must be tied tightly together (Fig. 25). Put on the second section, stitch through as before from right to left, and then make the kettle-stitch to secure the two sections together at this end (Fig. 26). All is now plain sailing to the last section and end-paper. During stitching, every three or four of the sections may be caught together on the tapes in order that the whole may be well pulled together (Fig. 27).

When the stitching is complete, cut the tapes about 2 in. up from the top of the book, and take out the pins at the bottom end.

If the directions as to marking off the positions of the tapes

and kettle-stitches have been followed, and the placing of the sections carefully done, the result may be that the book will not require cutting. But if the edges are uneven, it is more satisfactory to cut them and produce even and clean edges. This will certainly result in much less annoyance when the book is finished and in use than is the case with the " deckled " edge, as the uncut edge is called.

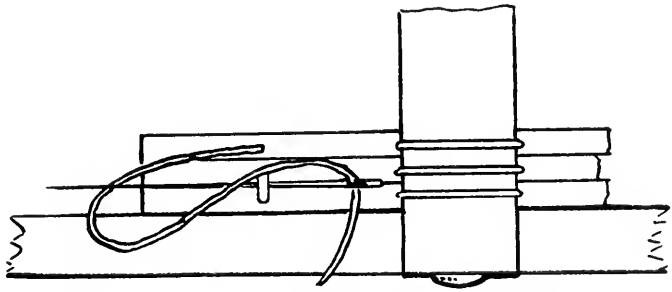

FIG. 26.

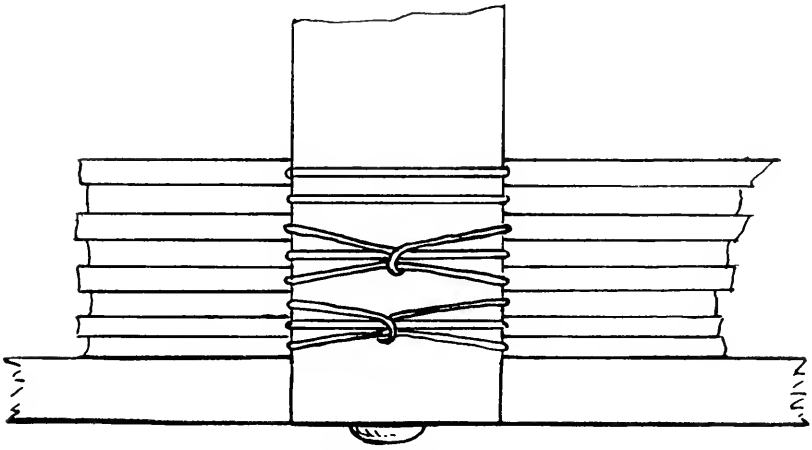

FIG. 27.

A cutting-press and plough are perhaps beyond the hope of any but the most daring requisitionist. They will cost at least 30s., but they are well worth it in labour and time saved. A cutting-press that will be found quite effective can be made as shown in Fig. 28, which gives working drawings of a press designed by the author and most successfully made by many of the students in his

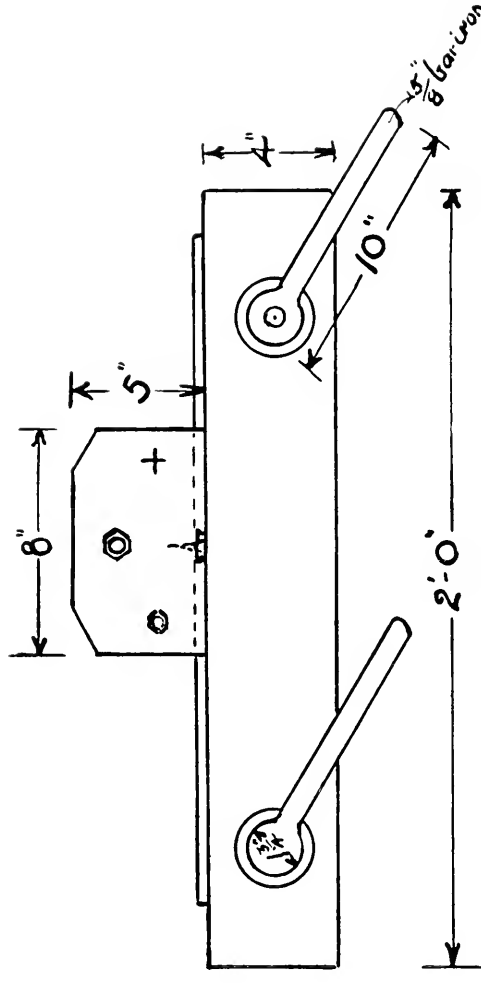

FIG. 28 (*a*) (SIDE ELEVATION).

classes for teachers. The press and plough are separate parts of the apparatus. The press is made from two large and two small pieces of wood (either beech or sycamore is best), two square-headed bolts and two handles, all of the dimensions given. The two small pieces of wood are fixed to the left-hand large piece (see Fig. 28 (*b*)) and form a track along which the plough travels when in use. In the piece of wood that carries this track, two holes are bored through and square depressions made. The bolts are passed through these holes and the depressions receive the square bolt-heads. These holes should be bored of such a size that the bolts fit tightly into them. In the other large piece of wood, the right-hand piece in Fig. 28 (*b*) and that in front of the spectator in 28 (*a*), two other holes are bored of such a size and in such a position that the bolts pass easily

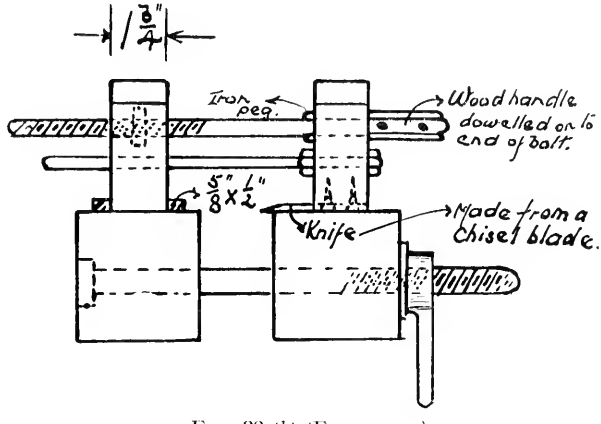

FIG. 28 (*b*) (ELEVATION).

through them. Large washers are put on each bolt, and the handles are fixed as in Fig. 28 (*a*). The press is then ready for use.

The plough should be made of the same kind of wood as the press. It consists of two pieces of wood (the dimensions of which can be found from the two elevations given) for the sides; two bolts to act as stays; and a third bolt, placed in the middle of the length and a little above the middle of the height of the upright pieces of wood, to be used as a handle and a screw for feeding up the knife, which is carried in the right-hand piece. (See Fig. 28 (*b*).)

In making this part of the apparatus, two holes are bored in the left-hand upright piece of such a size that, when the steadying bolts are put through, they will fit rather tightly. Corresponding holes are bored in the right-hand piece, but before passing the bolts through

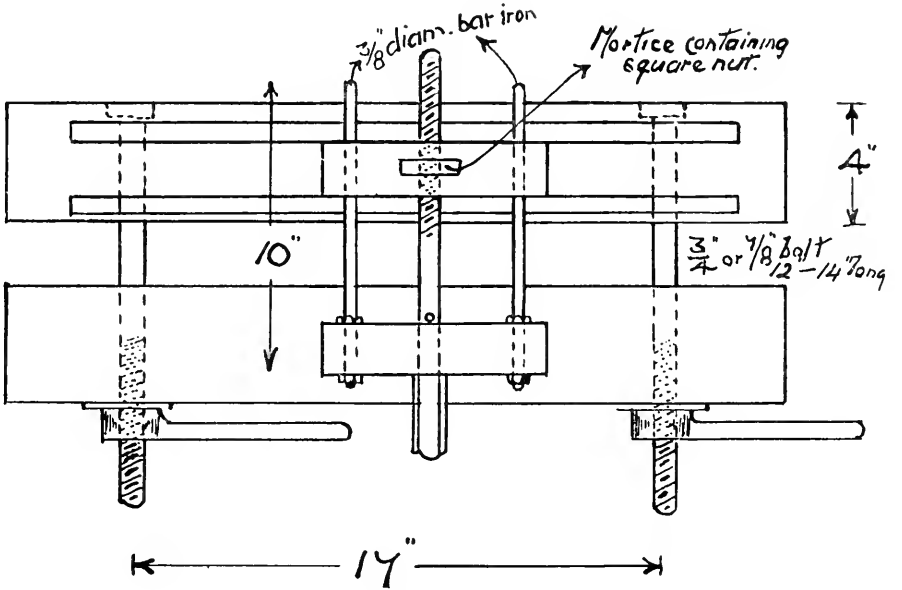

FIG. 28 (*c*) (PLAN).

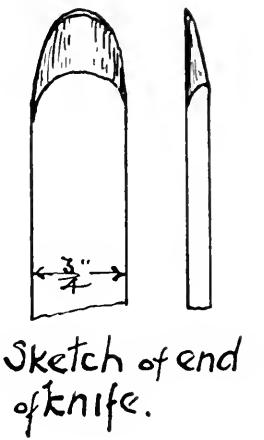

FIG. 28 (*d*).

these, a nut is screwed on to each bolt for, say, a distance of $2\frac{1}{2}$ in. Now pass the bolts through the holes and screw other nuts to the right-hand ends. Screw up so that the nuts nip on to the wood.

Now make another bolt-hole in the left-hand piece to take the long-screw bolt to be used as a handle. This hole should allow the screwed end of the bolt to pass through easily. Bore a corresponding hole in the right-hand piece.

Now make a rectangular slot from the top of the left-hand piece, wide enough to receive a square nut and of sufficient depth to allow the bolt, when the nut is in position, to be screwed through. Fix a wooden handle on to the unscrewed end of the bolt.

Bore a vertical hole through the shank of the bolt about $1\frac{3}{4}$ in. from the end of the handle, and pass the bolt through the right-hand piece.

Drop the nut into the slot in the left-hand piece and screw the bolt through. Now drive an iron pin tightly into its hole on the left-hand side of the right-hand piece. (See Fig. 28 (*b*).) On turning the handle it will be found that the right-hand upright travels, according to the way the handle is turned, either away from or towards the left-hand upright.

The cutting knife is made from a flat piece of good steel (*e.g.*, an old chisel ground and sharpened to shape as shown in Fig. 28 (*d*)). To fix it, a dovetailed slot is cut in the sole of the movable upright, in size equal to the thickness and width of the knife. Two holes are drilled in the knife and countersunk to take 1 in. flat-head iron screws.

Bore holes in the wood to receive these screws and fix up. The knife must be very often taken out for sharpening, so these screws must be carefully driven.

The following arrangement will usually be found to answer quite satisfactorily. A pair of 9 in. G cramps, a piece of close-grained hard wood about a foot square and $1\frac{1}{2}$ in. thick, with edges trued, a piece about 10 in. by $1\frac{1}{2}$ in. by 2 in. with two adjacent sides trued up, and a woodworker's 1 in. chisel are the requirements. Fix up as shown in Fig. 30.

In fixing, the back of the book must be perfectly alined with the edge of the board, and the top piece of wood fixed so that its true edge is at the front edge of, and parallel to the back of, the book. Put on the cramps and screw up as tightly as possible. Proceed to cut by laying the back edge of the chisel against the face of the fence, and draw along, pressing evenly and firmly, so as to cut through a few leaves at a time. Repeat until through all. Unscrew the cramps, turn the book round, and fix it so that the head is at right-angles to the side of the base board ; fix up the fence and cramps and cut the leaves. Repeat for the tail of the book. To cut a thick book is rather a laborious process for a boy,

and the teacher may find it necessary to help, but for thin books there is no physical difficulty, and boys can finish these quite well.

Rounding and glueing the back is the next operation. It is often asked, "Why are book backs rounded?" The answer is simply this. The stitching process adds thickness by the addition both of the strips of paper with which the sections have been repaired, and of a certain amount of thread. This extra thickness is distributed over a larger surface than would be the case if the back were kept flat. The question of improved appearance we need not discuss.

For rounding the back we must use our home-made press—see Fig. 13 or Fig. 28, which represents it in a reverse position. A pair of hardwood boards of design given in Fig. 29 will be required. Before putting the book in the press, it may be rounded by placing

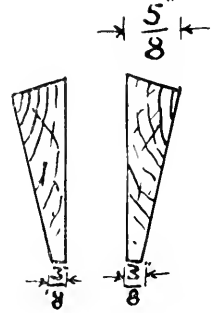

FIG. 29.

it flat on a table with the fore-edge—the open side—facing the body. Now press the fingers of the left hand into the middle of the fore-edge. This will force some of the sections out at the back into the form of a curve, and the process is assisted by spreading out the fingers of the right hand and pulling the backs of the top half of the sections towards the body. The back will now have the top half round and the bottom half still vertical. Turn over the book and do the same with the other half. Place the boards as shown in Fig. 31, put the book and boards in the press, taking great care that the arrangement is not disturbed, and screw up fairly tightly.

It may perhaps be found necessary to take it out and correct it two or three times before satisfaction is obtained, but it is worth while to have patience and so secure a well-rounded back. Now apply hot glue, not too thick; brush it well in, then rub it in with the fingers, and make quite sure that the back of each section

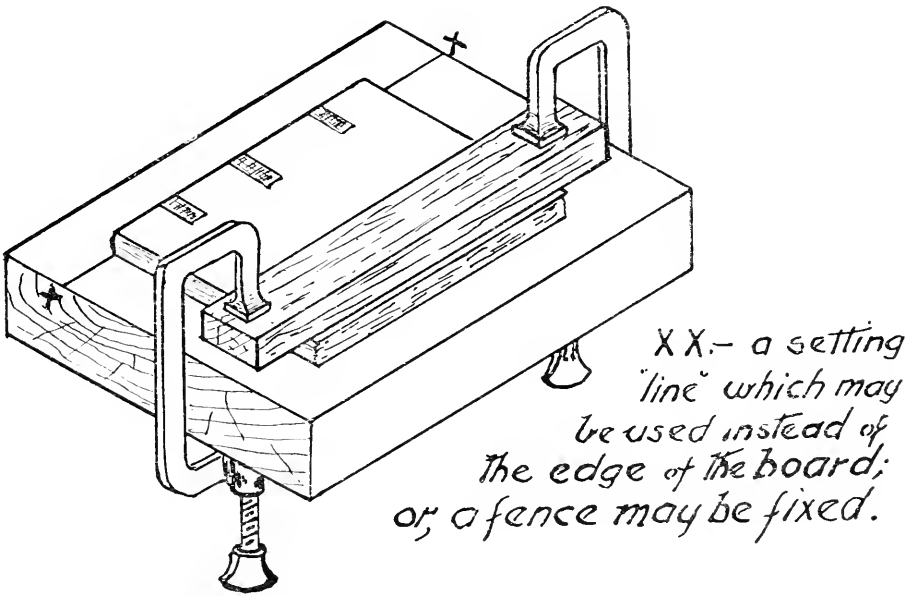
XX.– a setting
"line" which may
be used instead of
the edge of the board;
or, a fence may be fixed.

Fig. 30.

is coated full length. Leave the glue to set until it is just past the "tacky" stage, *i.e.*, until the fingers will just not stick. When the book is ready for hammering, a cobbler's hammer is a good substitute for a bookbinder's hammer, which is rather expensive, or an ordinary woodworker's hammer with a slightly rounded face may be made to serve. Screw up tightly as possible; hammer lightly, and, as the aim is to fan out the sections from the middle to each side, the blows must be placed in the direction of the arrow marks in Fig. 31. Hammer over to an even curve, and leave to

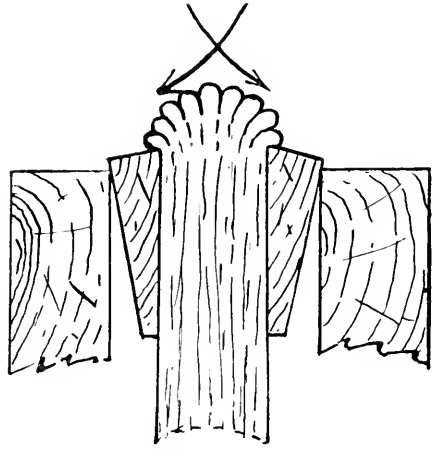

Fig. 31.

set, say, twenty-four hours. In the meantime, prepare the boards as already described, and, when the book is ready, attach them and finish with cloth or leather and paper as before. Put the finished book under pressure for a day or two. With children it is generally advisable to glue and round the back of the book before cutting. This makes it much easier for the child to fix up for cutting, but it is necessary to knock the "back" flat before fixing, and to retain this flatness during that operation. When the "front" is cut and the book taken out of the press, the back recovers its roundness, and so shows the hollow front edge.

CHAPTER V.

SEWING ON CORDS.

Some books, it will be observed, have raised semi-cylindrical bands on the backs. These books may or may not (sometimes the bands are simply stuck in for effect) be sewn on cords instead of on tapes. The arrangement of the stitches is different from that used in tape sewing. (See Fig. 32.) Instead of three tapes, five cords are used,

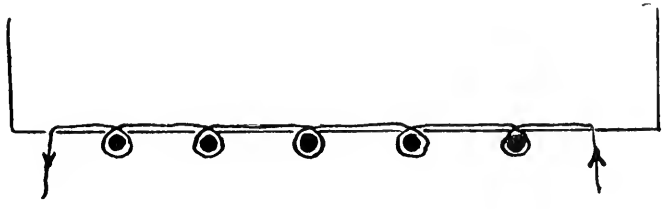

Fig. 32.

the attachment to the stitching-frame being exactly the same as in the former case. In stitching, be careful to keep the cords square across the back. There is a special hempen cord for this work, but, provided that the fibre is long, any string may be used. Rounding the back follows cutting, etc., as in the tape sewing. The boards are prepared as before, except that the two thin boards which make one are glued all over and stuck together. Strong boards of single thickness may also be used with advantage. Holes are then punched through each board as in Fig. 33. The first line of holes is about $\frac{1}{2}$ in., and the second line 1 in. from the back; the first line opposite the cords, the second a little to one side. A groove should be cut from the back edge to each hole in the first line. This will allow the cord to be made level with the surface of the board. Each of the second line of holes must be gouged out to, say, half the thickness of the board. (Again see Fig. 33.)

On taking the cord-sewn book out of the stitching-frame, the ends are cut off about 2 in. from the book, just as in the tape-sewn book. Fray out these ends with a bodkin or any such sharp-pointed tool, and reduce their bulk a little so that the ends may be worked up to points. Paste these fibrous slips and work to a point by twisting them at the tips. Thread through a hole in the first line, passing in on the top surface, beneath the board, and then out at the second hole (Fig. 34). Cut off about $\frac{1}{8}$ in. from the surface of the

board, and hammer well down, resting the board on some hard surface, an iron block being best. When hammered flat, the cords should fill the grooves to the first, and the conical depressions round the second line of holes.

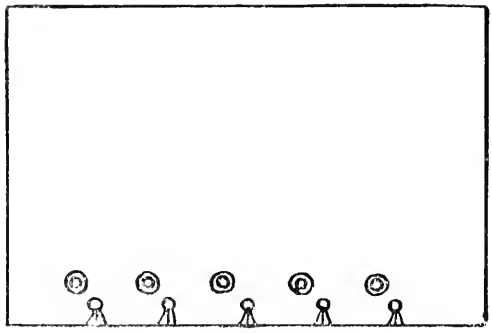

Fig. 33.

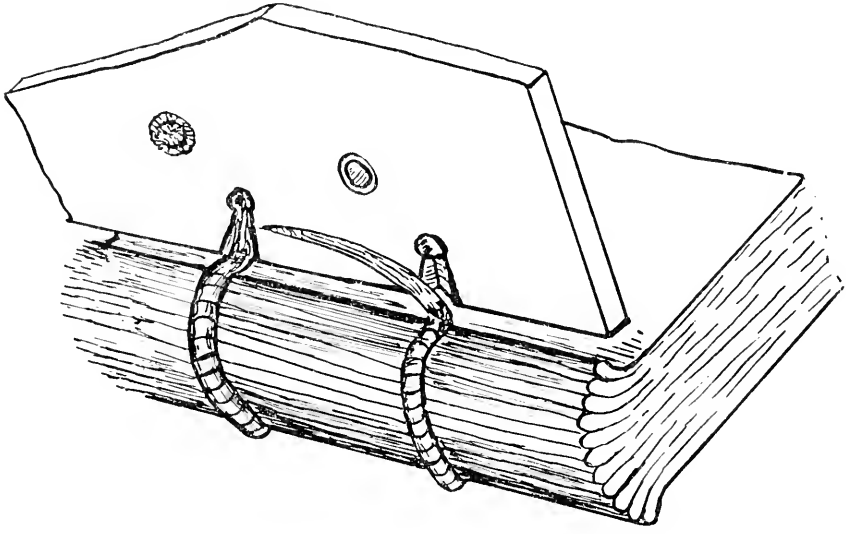

Fig. 34.

Take care that the hammer falls square, or the cords will be cut. When covering with leather the back of a book sewn on cords, it is necessary to rub the paste well into the leather and leave it to

soak for a little while. This makes the leather much easier to work, and is necessary in order that, when being fixed to the boards, it may be modelled down upon the cords. This modelling requires considerable digital strength, and may be beyond the physical powers of most children. Experience will help one to a decision. Nip up the bands to make them sharp and square across the back, having previously slightly softened the rounded back with a coating of paste. Put the book in the press, allowing the back to project about 3 in. Take the leather, place it carefully so that the book-back is exactly in the centre of its length and width, press the leather firmly to one side and draw the loose part over the back, pulling slightly. Press down on the second side. Stretch the leather a little lengthways, press down again and model firmly to the back and the bands with the fingers and a flat bone or boxwood folder, working any superfluous leather into the sides. Using the pliers, nip the leather on the bands, preventing, with the fingers of the left hand, any tendency to pull away from other parts. Rub well down in every part to ensure the attachment of all the leather, turn in at the head and tail as before. Leave to set, and then fit the corners and covering paper or cloth, and finish. For work with children it is better to use thin leathers. This does away with the need for paring, a difficult operation for young fingers. The edges of the leather may be thinned down by means of coarse glass-paper wrapped round a flat piece of wood and applied to the wrong or flesh side of the leather.

CHAPTER VI.

WHOLE BINDING AND CASE BINDING.

"WHOLE" binding may be done in cloth or linen. Leather is too expensive for "whole" binding in school. Where girls are being taught, many beautiful effects can be obtained by previously embroidering some appropriate design on linen, etc. In arranging any such design, care must be taken to ensure the correct placing of the ornament on the cover. When these covers are to be put on, it is best not to round the back of the book, but to leave it flat and cover it with a piece of stiff paper, cut to the width of the back. A piece of thin card, of exactly the same width as the paper itself and just about the same length as the book, is pasted and stuck on to the exact centre of the embroidered cover. (See Fig. 35.) Do not use more paste than is absolutely necessary, as it is likely to work through the texture of the material and perhaps spoil the work placed on it. The writer has found the following method very effective for dealing with fabric covers.

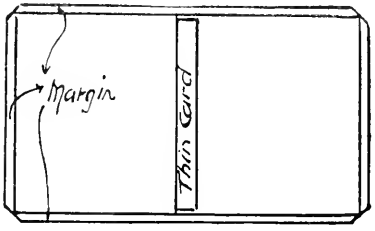

FIG. 35.

Brush a coating of hot thin glue over the boards and back of the book, and leave it to set until the "tacky" stage is reached. Lay a pad of cotton wool so as to cover the outside of each board, fitting over the head, front and tail edges just enough to "soften" them, *i.e.*, to do away with the hard sharp line of the edges of the boards. The outside edges of the boards may be softened by rounding off with a file. Take the covering cloth, with the piece of thin card in position; place it with the card centrally down the back of the book, rub very lightly, but so as to ensure good attachment, glue the inside of the boards for about $\frac{1}{2}$ in. or $\frac{3}{4}$ in. all round, and leave it till just "tacky" as before. Now pull the cloth gently but firmly over the back, turn in the edges and rub them well down on to the glued portions of the boards. Repeat on the opposite side and

leave to set. When set, paste the end papers back, insert a zinc plate at each end, close the book, put it under a light weight and leave it to set.

Case Binding.

It may sometimes be desirable to put only a paper or some other kind of temporary cover on to a properly stitched, or wire-stitched book, or the covers for a certain publication may be supplied ready-made. This class of work is known as "case-binding," and is the usual kind employed on cheap editions.

After stitching, cut the tapes, glue the back, cut the edges, and fix the muslin to the tapes, but not to the waste paper as explained in Chapter II. If a paper cover is to be attached, set out the size and cut it out. Paste a 4 in. strip down the middle of the inside surface of the cover. Take the book, place the back carefully on the centre of the cover and press down. Press the muslin carefully back on to the cover, rub well down, and leave it to set. Paste the remaining part of the cover, turn back the end-papers, rub well down and again leave to set.

When ready-made cardboard covers are to be attached, the centre back is not pasted. Paste a margin on each side of the centre back to receive the muslin and tapes. Press back the muslin as before and leave to set ; then fix the end-papers.

Single boards may be attached on this principle by placing a piece of waste paper under the muslin, rubbing hot glue on to the latter and then carefully adjusting the board in position. Leave about $\frac{1}{8}$ in. space between the back of the book and the edge of the board. Rub well down, repeat on the other side, leave to set and finish as before.

A Book-cover.

A simple book-cover may be made as shown in Fig. 36. This may be made in silk, linen, calico, bookbinders' cloth or leather

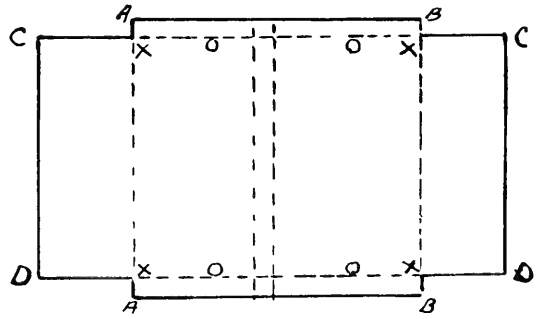

FIG. 36.

and ornamented in silks, wool, cotton, or oil or water-colour, and is very useful for keeping a good book-back clean.

The size will depend on the size of the book to be covered and should be about $\frac{1}{4}$ in. longer than the book. The middle portion to cover the back of the book should be about $\frac{1}{8}$ in. wider than the thickness, and the distance from the vertical line XX to the line of the hinge about $\frac{1}{8}$ in. wider than that of the corresponding dimension on the book.

Of the overlaps, ABXX should be about $\frac{5}{8}$ in. and CDXX about $2\frac{1}{2}$ in. wide.

From the measurements obtained in this way set out as follows—

Turn AB over on XX and stitch it down. Turn CD over on XX and stitch along XO, leaving CD open to receive the cover of the book.

CHAPTER VII.

THE CONNECTION BETWEEN BOOKBINDING AND OTHER SCHOOL SUBJECTS.

THERE is a great deal written of the connection of Art to Handwork, and to Bookbinding in particular. The writer is quite well aware of the value of Handwork as a means of teaching the fundamentals of many school subjects, but there are schools where no use whatever is made of Handwork as a general school method, where it is not used to help in teaching other school subjects. Such schools deal with the work merely as one of the subjects in the curriculum—a curriculum, it may be, which is cut up into so many self-contained compartments that no overlapping of subjects is allowed.

It is often left to the teachers of the special "hand and eye" subjects to make any connection they care to make with one another's work. The correlation of Handwork and Art is, perhaps, the most easily accomplished, and of greater value than can be secured in most other combinations. A few minutes weekly spent in conference between the Handwork and Art Masters will be most valuable and stimulating. Both must be prepared to give and take. Through such conversations the children can be made to see the connection between, and the direct application of, what is learned in various subjects. Their outlook on particular subjects is considerably broadened. Their ideas of "fitness," "finish," "proportion," and "balance" are developed.

As a simple illustration of what may be done in this direction, let us take a case where it was the original intention on the part of a child to "half-bind" a book, with corners of the same material as the back. The result is a shape that is, for a beginner, rather awkward to fill with a design. The child may, or may not, have reached that stage in design when his power is sufficient for him to arrange a pattern on such a space; in fact, he may not be past the stage of designing for rectangles. It is sufficient for the Art Teacher to suggest that it would be better for the child's development in design if the cloth corners were omitted, producing rectangular spaces. From the bookbinding point of view the effect is quite as good, if not better. The child has not lost anything fundamental and has gained considerably in Art. Bookbinding has gained in addition because the child learns something further about "finish."

Designs may be arranged and cut for use as stencil-plates to be applied to all kinds of bindings in fabrics (Fig. 38). There is a very wide scope in materials for this work. Children in the writer's classes have brought coarse canvas, Harriss linen, corduroy, calico,

velvet, and cotton; all have been most successfully used in the way described, and many have been very prettily decorated. The great point here is that the child is making use of apparently waste materials, and is making them up into something of decided value. There is a great principle involved in this idea, and the stronger its application in all work, the better the training in true economy for our future citizens.

Many schools do work in modelling metals—foil brass, copper, and aluminium. There are arguments against the use of these materials as substitutes for linen, leather, or paper in panelling book-backs. There is always the possibility that the metal on the back of a book may, when the book is put into the shelves, scratch the covers of adjacent books, and again, that high relief may be

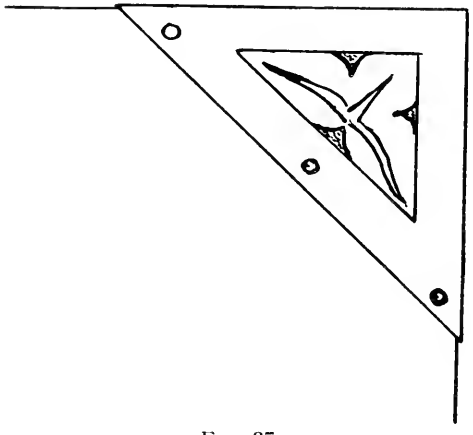

FIG. 37.

crushed down. Avoid high relief. Back up the raised parts with a gesso mixture of glue and whiting or plaster of Paris; or coat the back of the raised part with glue, fill the depression with sawdust, and then brush a coating of glue on a piece of stiff paper and fix down so as to hold in the sawdust.

The corners of the boards may be covered with metal. The shape is exactly the same as in Fig. 16. Some simple design may be traced on them and worked by means of a bone folder, outlining on the face and modelling from the back. The work may be modelled on a thick pad of blotting paper. The metal is fixed on to the boards by means of an overlap, as in the case of cloth or leather corners, and two or three small pins, driven in from the face through the metal and board and clinched inside. (See Fig. 37.)

A panel of metal may be fixed on to the cover of a "whole-bound" book as in Fig. 43. This can be kept quite flush with the leather

FIG. 38.

cover by making a depression in the cardboard back. This depression, with the thickness of the covering leather should be deep enough to receive the full depth of the relief on the metal, and so prevent both the crushing down of the modelling and damage to other books on the shelf. The panel can be fixed with pins.

Some simple decoration in leather can be carried out by means of a bone folder. By rubbing the thin edge of a folder along the edge of a ruler laid on the piece of leather to be decorated, dark indented lines are produced. These can be used to emphasize the tapes and cords on the back, and for " lining " the corner pieces or the edges of the leather covering the boards. On curved backs, sharp black lines can be produced by means of a piece of thin string pulled quickly from side to side across the back. (See Fig. 39.) If the folder or string is moistened slightly when used, sharper effects are produced.

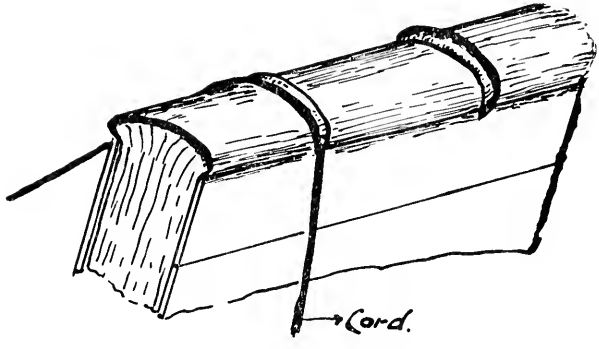

FIG. 39.

This operation is called " blind-tooling," and any child can do it. Fig. 44 is an example of this class of work and can be executed by fixing the design to the book-back and going over all the lines with the point of a bone folder. This transfers the design to the leather. Take off the paper, and then, slightly moistening the lines of the design, go over again with the folder. This depresses the design still further and sharpens the whole effect. The writer has seen, in an elementary school, one or two splendid examples of blind-tooling. Another mode of decoration is that known as " cut work in leather." This style is most suitable for whole-bound books. The design is transferred to tracing-cloth, and the surface of the leather is rubbed over with a damp sponge to make it appear just moist. The tracing is fastened on to the face of the leather by means of drawing-pins, and the design is traced over with, say, an agate tracing-point, thus impressing the lines into the leather. The tracing-cloth is removed, the leather is placed on a slab of hard

wood or zinc, and with a small knife the outlines of the pattern are sharply cut to a depth of about half the thickness of the leather. When the pattern is cut, moderately damp the surface afresh, and with the tracing-point go over the outlines, thereby widening them and giving them a strongly marked appearance. The ground may then be punched as a woodcarver punches his ground to throw up the pattern. This is all that is necessary and advisable. Many people model up from the back, but any relief in leather complicates matters considerably, and is generally beyond the powers of children.

Some teachers may be able to requisition tools and materials for tooling in gold, silver, and aluminium. It is advisable to choose one's patterns for tools very carefully, and to make the first few tools required; not because the tools will be better made than those bought at the merchant's, but because in this way one will learn more of the possibilities and limitations of a few tools in arranging designs for book covers. (Fig. 42 gives a few combinations put

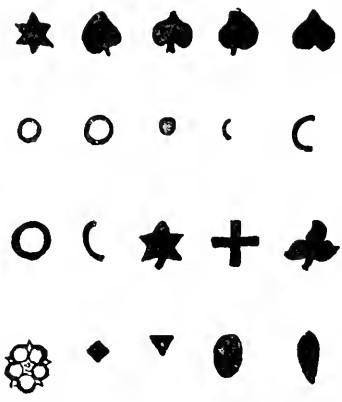

FIG. 40.

together by using some of the tools whose faces are represented in Fig. 40. See also the *Frontispiece*, which is a design executed wholly by means of home-made tools.) Round bar brass, $\frac{1}{4}$ in. in diameter, is, with the aid of a few small files of different sections, very easily made into tools. The end of each piece of brass is filed to form a tang, which fits into a plain cylindrical handle, and the other end should be rubbed smooth and flat on pieces of emery cloth, finishing off with the "flour" degree of fineness.

For this class of work the following are essential. An alphabet of handle letters, leaf gold, silver, or aluminium, glair, and a velvet pad. The alphabet will cost from 10s. upwards according to size, good gold leaf can be obtained at 2s. 6d. for twenty-five sheets;

silver leaf for about 1s. per twenty-five sheets, and aluminium leaf at about the same price. Glair is obtained from white of egg diluted with vinegar. Albumen is now sold in the form of a yellow crystalline substance, and in this form is more convenient for school use. It is made up into glair as follows—1 oz. albumen to ½ pint of water, or in proportion ; place in a vessel in cold water and stir once a day ; on the third day it is ready for use. Do not make up more than a 2 oz. bottle full at one time, as, when kept a long time a very unpleasant odour is developed.

To print, say, the title on the back of a book, decide on the spacing of the separate words ; which may have to be placed one above the other as in Fig. 41. Measure the back carefully and set

Fig. 41.

out its width and the spaces between the words on a piece of thin paper. Sort out the handle-letters required, and put them on to a gas ring to heat. In order to prevent mistakes and save time, the tools should be placed in the order in which they will be required. Fix the piece of paper on a waste piece of leather, take up the first tool and cool it on a pad of damp cotton wool until it just ceases to hiss. Do not place the letter end of the tool on the pad, or the heat will afterwards run down from the body of the metal and cause the burning of the leather. Now place the tool in position on the paper and, keeping it vertical, press it down firmly to form a depression. Put the tool back on to the stove. Follow on exactly in the same way with the other tools until the whole title is printed—blind-tooled—on the paper. Lift up the paper and fix it on the back of the book. Take up again the first tool, cool off and put it exactly into the depression in the paper and press firmly, leaving a depression in the leather. Again repeat with the other letters,

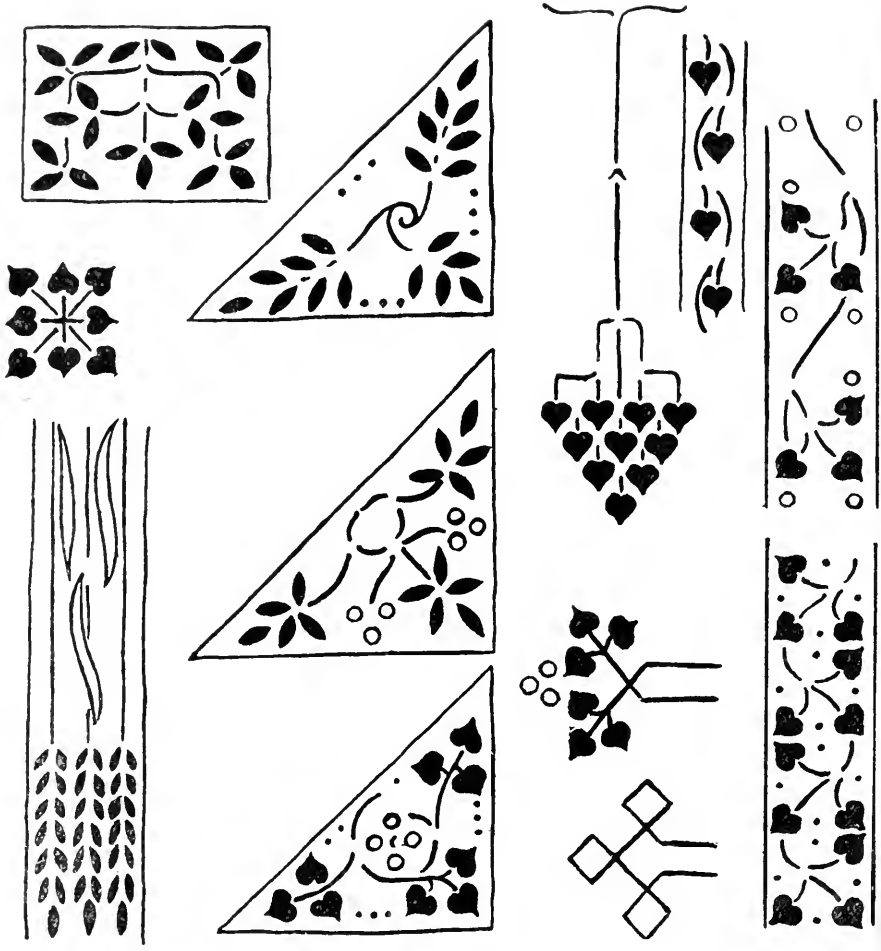

Fig. 42.

Fig. 43.

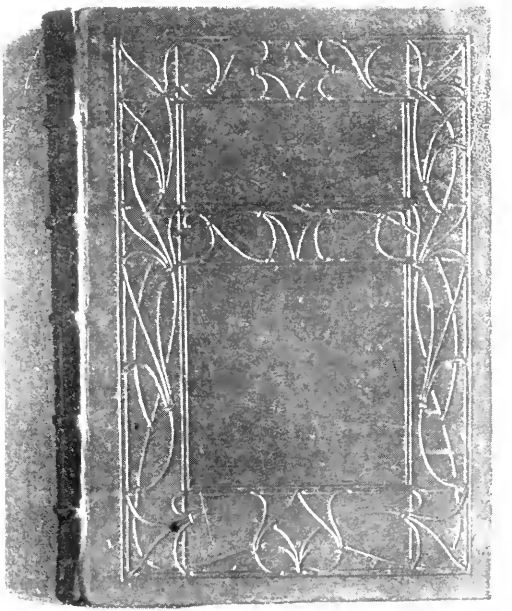

Fig. 44.

until the whole title is blind-tooled into the book-back. Brush over the letters with a fine brush dipped in glair and leave to dry. Now rub the leather, around and over the blind-tooling, with a pad of cotton wool slightly greased with coco-nut oil. Apply very little pressure (very little more than the weight of the cotton wool is necessary) or the grease will be rubbed into the depressions and prevent the adhesion of the gold.

Take out a leaf of gold, place it on the cushion, cut off a strip with a knife and, picking up with a piece of slightly greased cotton-wool, lay it over the depressions. Repeat until all the tooling is

Fig. 45.

covered with gold. Take up the hot tools and repeat the impressions, taking care that the whole of the letter receives the pressure. Superfluous gold can be rubbed off with a piece of india-rubber. Bookbinder's rubber is best, as it lifts most strongly. Rubbing with clean cotton-wool is usually quite sufficient to take off superfluous gold. If it is found that some gold has not stuck, re-glair and go over again with the hot tools. Solid brass wheels are made for running straight lines. (See Fig. 45.) These are essential when laying on gold leaf, as an ordinary lining tool such as could be used for blind-tooling would drag the gold and spoil the line. A wheel having a diameter about equal to that of a threepenny bit will be found to be an excellent tool for running free lines. A large wheel, say 2 in. or 3 in. in diameter, is best for long straight lines.

Gold may be laid on "Rexine" cloths in exactly the same way as for leather.

CHAPTER VIII.

HINTS AND SUGGESTIONS.

Head-bands.

These are stuck or stitched on to the head and tail of the book to afford a finish, and, in the case of the stitched head-band, to strengthen the ends of the book against which the fingers are generally placed when pulling the book out of the shelf. In most modern work the head-band used is cut from lengths of woven material and made to loop over a core of cane, string, or any other strong foundation. It is made in a large variety of colours, designs, and sizes, and can be obtained in cotton and silk from 1s. per dozen yards upwards.

For school work it is perhaps advisable for a good while to use this kind of head-band, especially as it may, if desired, be woven by the children themselves.

The headbands are put on just before the fixing of the cloth, etc., which is to cover the back; after the back has been rounded and the boards attached. Fig. 46 illustrates a piece of " made " head-band

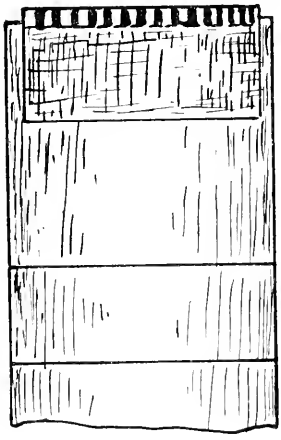

Fig. 46.

stuck in position by means of paste. It is obvious that this arrangement will add but little to the strength of the head and tail of the book.

To Stitch a Head-band.

Obtain a piece of catgut, vellum, cane, or string, in thickness a little less than the projection of the boards over the book. Cut

off about 3 in. Thread a needle with button-hole twist, choosing the colour to match the leather to be used in binding. Fix the book in a press or vice as in Fig. 47. Pass the needle in at X, and work it forward to the back, so that it comes to a point in a line with the inside face of the board, as at Y (Fig. 48). Push the needle through the back of the book at such a depth that it comes out just

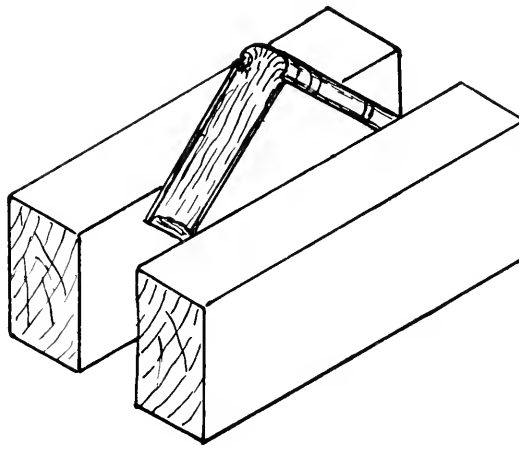

Fig. 47.

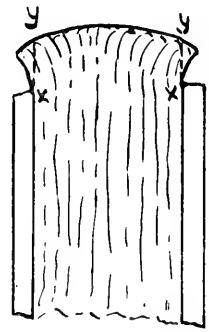

Fig. 48.

below the kettle-stitch. Draw the silk through until the needle end is about twice as long as the free end. Lift up the needle end and push in the needle again at the same place as before. This will form a loop into which the gut or cord will be placed. Pull slightly on both ends of the silk so as to hold the cord. (See Fig. 50.)

Holding the free end of the silk in the left hand, bring up from the back of the book with the right hand the needle end of the silk. Pass the latter into the left hand and hold taut. Take hold of the free end with the right hand, pass it across the needle end, under the cord, and pull tight. This forms a small bead on the top of the book. (See Fig. 49.)

Now bring the free end over the cord, afterwards pass it into the left hand, and hold taut; take the needle end in the right hand, pass it across the free end, under the cord, and pull tight as before.

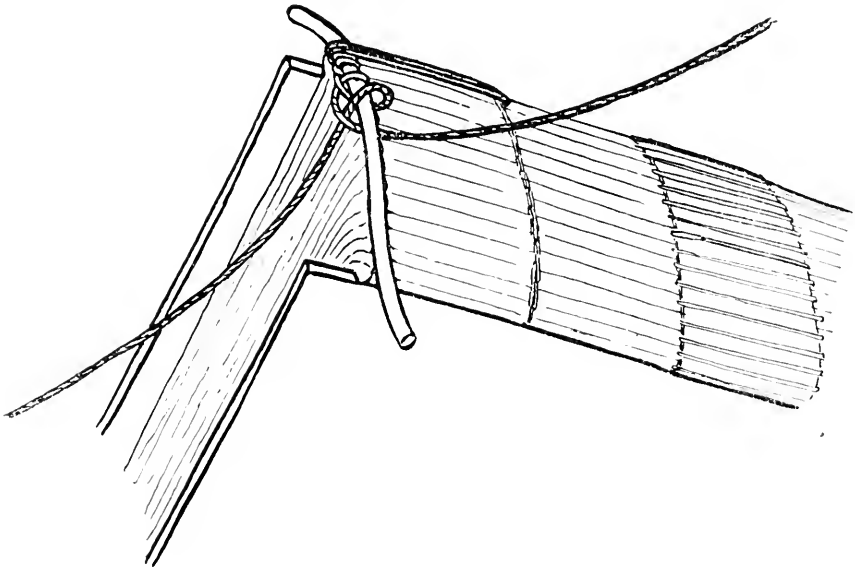

Fig. 49

Another bead will be formed, and these operations repeated will result in a series of beads right across the top of the book. The beads should sit quite close on the book. It is advisable to anchor down the cord after every three or four stitches. To do this, repeat the operation performed at the commencement of the head-band. Bring the needle from the back, over the cord, pass between the leaves and through the back, out below the kettle-stitch. When a line corresponding to XY has been reached on the opposite side, the silk must be tied off at the back. Cut and fray out the ends, and paste them down to the back. Cut the cord close up to the silk. Paste a piece of stiff paper over the stitches at the back to prevent any projection from showing on the leather cover. Having

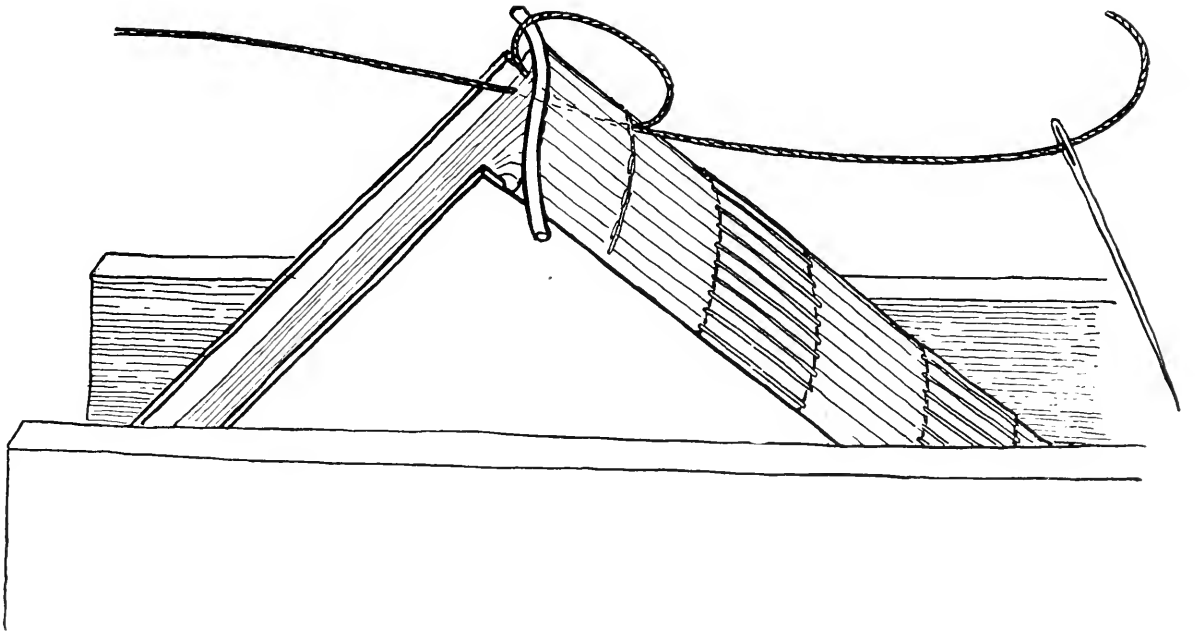

FIG. 50.

worked the head-band on the "head" of the book, the latter is reversed in the press and the "tail" treated similarly. The chief difficulty will be found in keeping the beads regular; but a little practice, with care in keeping an even tension, will overcome all this.

Construction of a School Library Folio.

Although this article does not, strictly speaking, come into the class of bookbinding, a most useful folio in book form can be produced by working to the following instructions.

The folio is built up in concertina fashion as in Fig. 51. Having

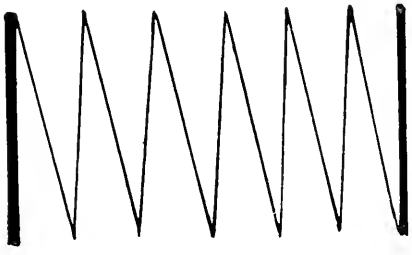

Fig. 51.

decided on the size and number of leaves (say 10 in. by 7 in. and fourteen leaves, giving thirty pages), cut two pieces of cardboard or millboard, $10\frac{1}{4}$ in. by $7\frac{1}{4}$ in., and sixteen sheets of paper, 10 in. by 7 in. Bind the edges and cover the surfaces of the cardboard. Cut strips of binding cloth $\frac{3}{4}$ in. wide and 10 in. long. Take two sheets of the paper, lay out side by side with $\frac{1}{8}$ in. space between them. Paste one side of a piece of cloth, lay it on to the paper, and rub well down. Turn over the papers, paste another strip of cloth, lay it on exactly over the first strip. Rub well down and into the hinge. (See Fig. 52.) Take another sheet and two more

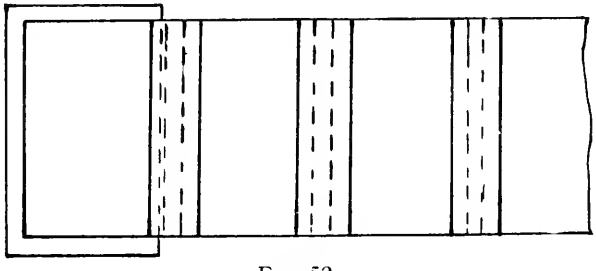

Fig. 52.

strips of cloth. Lay the third sheet of paper alongside the two already fixed, paste the strip of cloth and lay it over the joint. Reverse the papers and lay on the covering strip.

Repeat until all the sheets are fixed together. Fold it up carefully and leave it to set. When it is dry, bind the two end sheets on to the cardboard backs, paste the end papers down to the boards, as in Fig. 51, and leave it to set. The names of the books in the library may now be written on the pages. When opened out, this book will be about 9 ft. 6 in. long, and for use as a book which may be consulted by a number of children at the same time will be most valuable. It can be made to hang by fixing tags of cloth after every four or five sheets. It could be pinned on the dado rail along one wall of the class room. A stronger, but much bulkier, book could be made with leaves of cardboard covered with paper of any desired colour.

Construction of a Pocket Wallet.

Pocket wallets are very useful for children, and they might very well make their own in the following way.

Decide on the size of the book and case, say 6 in. by $4\frac{1}{2}$ in. Cut three pieces of thin card and lay them out as shown in Fig. 53.

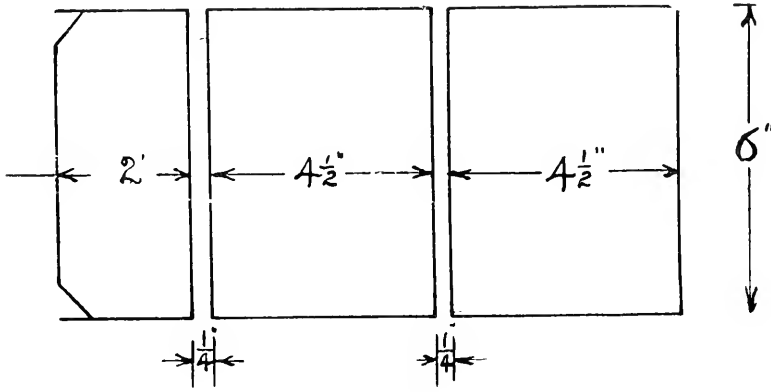

Fig. 53.

Allow an additional $\frac{1}{2}$ in. all round and find the size of the piece of cloth required to cover all three pieces on one side and to fold over $\frac{1}{2}$ in. on the inside. Paste the cloth on and fold over. Take a piece of elastic, $\frac{3}{8}$ in. or $\frac{1}{2}$ in. broad, and 10 in. long. Cut a slit in the centre of the middle piece of cardboard, and through this from the outside, pass both ends of the piece of elastic, leaving about $\frac{1}{2}$ in. for turning back in opposite directions and gluing down.

Allowing a margin of $\frac{1}{8}$ in. or $\frac{1}{4}$ in., cover the inside with strong paper or cloth. Cut two more pieces of cardboard, $5\frac{1}{4}$ in. by $4\frac{1}{4}$ in.; cover each with cloth, allowing about $\frac{3}{8}$ in. for folding over. Glue or paste down the overlaps on one long and two short edges of one piece and one long edge only of the other piece. Take the latter, glue the overlaps on to the right side of the cloth, and place on B with the open side on the left so as to leave an equal margin on the three sides 1, 2, 3. Press down firmly.

Cut two strips of cloth $4\frac{1}{4}$ in. long and 1 in. wide. Fold lengthwise into four equal folds. These will form hinges for the pocket. Glue them down to A as in Fig. 54. Take the remaining piece of covered

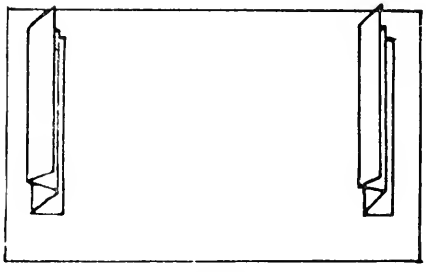

FIG. 54.

cardboard and, gluing the top flanges XX of the hinge and the loose flange of the long side, stick them down firmly and leave them to set. Make a small book of thin plain paper as explained in Chapter I. Push one side of the book into the narrow space between the back of the wallet at B and the inside piece of cardboard. Close up, stretch the elastic band over all, and the wallet is complete. For fixing together such articles as these, many people prefer stitching to gluing. For cloth and paper, glue will be found quite efficient, and it is not always possible, however desirable, to allow boys to sew in this way.

Many variations can be made in this type of article. The children will be found ready with modifications and extensions. Needle-cases, card-cases, season-ticket holders, paper-money wallets, stamp purses, etc., are all varieties of the same type of construction.

Inter Alia.

Some children may commence stitching by laying down the end section first; *i.e.*, working from the back to the front of the book. Allow them to do this; it makes no difference to the result and shows that they understand collation.

Look through all books during the course of the stitching to find out if any sections are upside down.

When children are stitching properly and well, encourage them to take home their work and finish the operation. A great deal of valuable lesson-time is thus saved and another link provided between school and home.

Watch carefully the construction of the kettle-stitch; it will be neat if properly made, but when wrongly made, it tends to slovenliness in finish.

A discarded "clicker's" knife makes an excellent tool for cutting cardboard. (A "clicker" is one who cuts out boot "uppers.") If bookbinding is being taken in the Handwork Room, the bench vices will be found quite efficient presses for small work.

When working in glue on cloth or leather, thick Rexines or Pegamoid should be glued not pasted down. Quick workers should be encouraged to work in glue in preference to paste.

When manipulating pasted or glued cloths, keep a towel to hand in order that the fingers may be kept clean. Should a spot of paste get on to, or work through the surface of a cloth, it will probably take off the gloss. This may be restored by means of a coating of thin varnish or a coating of glair. Paste made from rye-flour does not work through the texture of cloth so easily as that made from wheat-flour.

When thin boards are used for backs and the end-papers are being pasted down, the easiest plan is to paste that surface of the end leaf which is to be in contact with the board, and then close down the board on to the pasted surface—not lift up the end leaf to the board.

Accuracy of the "individual's" highest capacity must be demanded at every stage, and the results in very many cases will be of a very high standard of excellence.

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